The Journal

OF THE

AMERICAN DENTAL ASSOCIATION

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CEPHALOMETRIC DIAGNOSIS: ITS IMPLICATION IN TREATMENT

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CEPHALOMETRIC or standardized head roentgenograms have done more than any other single diagnostic aid to establish what constitutes the normal or the abnormal in dentofacial and cranial structural relationships.

Angle[1] defined normal occlusion as the "normal relations of the occlusal inclined planes of the teeth when the jaws are closed." Strang[2] writes:

> Many years have passed since this basic theory was advanced, and the conception of normal occlusion of the teeth has broadened tremendously. . . . Normal occlusion of the teeth may be defined as that structural composite consisting fundamentally of the teeth and jaws and characterized by a normal relationship of the so-called occlusal inclined planes of teeth that are individually and collectively located in architectural harmony with their basal bones and with cranial anatomy, exhibit correct proximal contacting and axial positioning and have associated with them a normal growth, development, location and correlation of all environmental tissues and parts. . . . This is . . . indeed a lengthy definition, and if memorized parrot fashion may have no meaning whatsoever to the student.

In any event, Strang's definition, in contrast to Angle's, again emphasizes that the field of orthodontics is no longer confined to the correct relationships of the teeth to each other, but must include the relationships of the teeth to the jaws, face and cranium. For brevity, the following definitions of the normal and abnormal may be considered: 1. Normal dental or dentofacial relationships exist when these structures are in acceptable equilibrium with each other and with the cranium. 2. Abnormal dental or dentofacial relationships result when any or several of the dental or facial structures are not in acceptable equilibrium with each other or with the cranium.

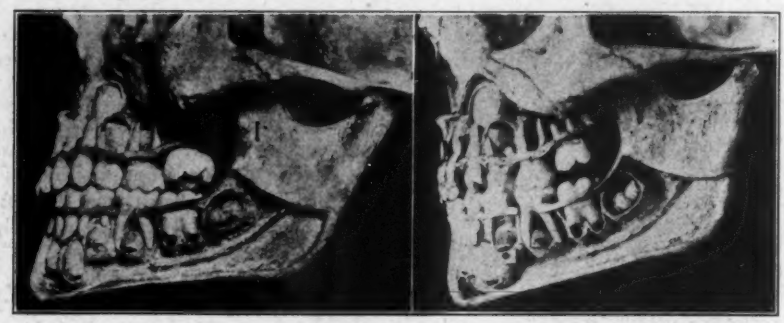
It is the purpose of this paper to analyze certain of these existing concepts of the normal and abnormal interrelations of dental, facial and cranial structures and, in addition, to present some of their implications in treatment. These relationships, thus far, have been re-

vealed in the living only through the cephalometric roentgenogram.

Strang, in his well-compiled text,[2] illustrates at least five concepts of normal occlusion, two of which are presented in Figures 2 and 3. What is even more illuminating is the fact that most of these identical illustrations are used in all the present orthodontic texts,[1, 2, 3, 4, 5, 6] for the same purpose of picturing a concept of normal occlusion or a norm with which the occlusion of a given individual may be compared. Now, while all will undoubtedly agree that the dentures in these illustrations are beautiful examples of tooth interdigitation and occlusal relationships, let us see what can be learned about the relationships of these dentures to the face and cranium.

In the main, this description can be sanctioned, but it does not agree with the relationships in the illustrations in Figures 2 and 3, in which the ridge descends to cover the distal rather than the mesial root of the maxillary first molar. This is particularly well demonstrated in the skull in Figure 3, which was glamorized by some one years ago calling it the "Old Glory of Orthodontia." This skull has been in my possession for some time, so it has been possible to study it carefully.

Let us compare the cephalometric roentgenogram of this skull and that of another well-proportioned skull in which the occlusion is also ideal. (Figs. 4, A and B.) In both of these, the zygomatic ridge has been outlined with wire and,



A B

Fig. 1.—Normal occlusion of deciduous teeth. A and B, photographs of the same skull from the collection of Atkinson, are reproduced here exactly as pictured in two texts. The orientation of the photographs to the background seems to change the relationship of the lower incisor to the menton, or bony chin point. This emphasizes the need for a standardized technic of orientation for best case analysis. (A from Strang's "Text-Book of Orthodontia," Ed. 2, p. 47; B from Dewey-Anderson's "Practical Orthodontia," Ed. 6, p. 81.)

DENTURE RELATIONSHIP TO ZYGOMATIC RIDGE (KEY RIDGE)

Atkinson,[7] in describing the relationship of the teeth to the zygomatic ridge (key ridge), says:

> One may state as a fact that in all types this ridge descends downward and forward, continuing the graceful curve of the zygoma to cover the mesiobuccal root of the maxillary first molar in the adult. The curve of the mesiobuccal root of the maxillary first molar conforms to the curve of the key ridge.

while the wire shows that the ridge covers the mesiobuccal root in the latter, it covers the distal root in the skull "Old Glory." What is the implication in treatment? Which of these two dentocranial relationships would you choose as an objective in treatment? Is it reasonable to say that a bimaxillary protrusion exists in the skull "Old Glory" even though the occlusal pattern and interdigitation seem ideal? Probably not for this specimen, because the cranium, jaws

and denture are, without doubt, in acceptable equilibrium; yet we might hesitate to produce these relationships in our own patients unless the architecture of the head as a whole was adaptable to them. Thus, we see that the relationships of the structures outside the denture are as important as those within it.

RELATIONSHIP OF LOWER INCISORS TO THE MENTON AND MANDIBULAR PLANE

Consideration of two other relationships, those of the mandibular incisors to the menton, or bony chin, and mandibular plane (indicated by a line tangent to the inferior border of the mandible, Figure 2) is timely because of the interest manifest in Tweed's[8] new philosophy of treatment and the subsequent revival of interest in the "forward translation theory" advanced some years ago by Grieve,[9] who stated that "excessive overbite, and overjet . . . result chiefly from insufficient growth of the jaws and consequent forward translation of the teeth." However, we shall see, with the ample cephalometric evidence now available, that this observation can be questioned, at least so far as the mandibular incisors are concerned.

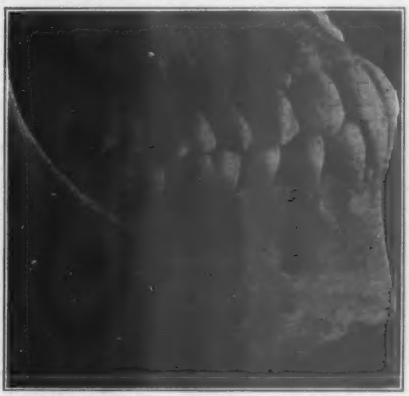


Fig. 2.—Normal occlusion. A white line has been drawn to designate the mandibular plane with a vertical line at right angles and tangential to the menton or bony chin point. That the mandibular incisors are well forward is evident, since the vertical line touches them. The zygomatic or key ridge descends to cover the distobuccal rather than the mesiobuccal root of the maxillary first molar. (From Strang's "Text Book of Orthodontia," Ed. 2, p. 41.)

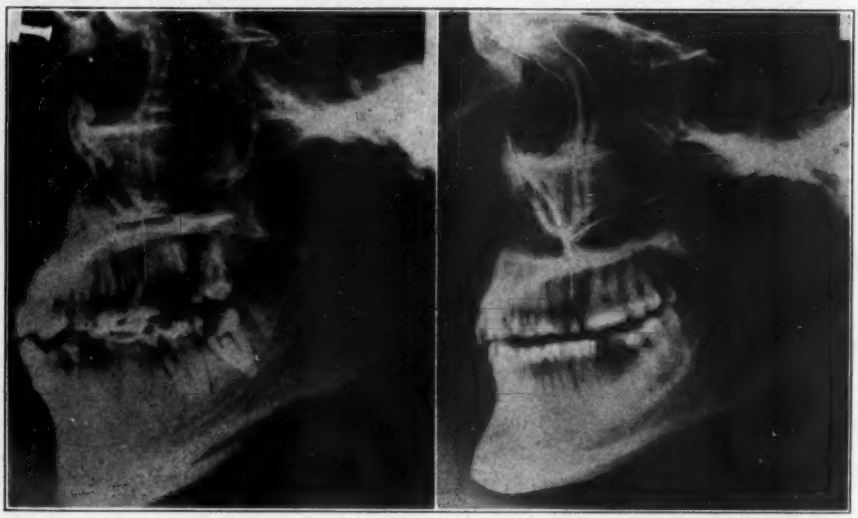
Margolis[10] recently published an excellent report on a cephalometric analysis of the axial inclination of the mandibular incisors with respect to the lower border of the mandible, in which he concluded that "for the vast majority of white children treated by orthodontists, the best results are obtained when the mandibular incisors are 'vertical' and form a right angle with the mandibular plane." This right angle relationship may be questioned, however, if the mandible is not normal in form; for example, when the gonial angle is obtuse.

Fig. 3.—Skull (in author's possession and known as "Old Glory.") The mandibular incisors are well forward over the menton, or bony chin point, and the zygomatic ridge descends to cover the distobuccal rather than the mesiobuccal root of the maxillary first molar. (From Strang's "Text Book of Orthodontia," Ed. 2, frontispiece.)

While this knowledge of axial inclination is valuable, what must be emphasized as even more important is the fact that various persons may have the same acceptable axial inclination relationship

of the mandibular incisors to the mandibular plane, but these incisors may be over the chin point or a considerable distance back of it, as illustrated in Figure 5, A and B. Both Tweed and Margolis recognize this possibility, but have not discussed it. The question as to what constitutes a normal or acceptable relation of the mandibular incisors to the menton might then logically arise. Should it be that illustrated in the roentgenogram, Figure 4, A (also shown in Figure 3) or that in the other well-proportioned skull (Fig. 4, B)? Referring again to the two textbook illustrations of normal occlusion (Figs. 2 and 3), it will be found that, in these, the incisors are well forward over the chin point. In fact, if a line is drawn at right angles to the line indicating the mandibular plane and tangential to the prominence of the bony chin (Fig. 2), this vertical line will either touch the labial surface of the incisors or be just slightly in front of it. Now let us examine this mandibular incisor relationship in a fairly representative group of deformities as illustrated in their profile roentgenograms. (Figs. 5, 6, 7, 8 and 9.)

In this entire group, even in the most pronounced cases of overbite and overjet, the mandibular incisors are not found to be too far forward in relation to the bony chin, unless, indeed, the relationship in the textbook illustrations is not normal. It is this observation that leads to the questioning of Grieve's forward translation theory as quoted above.



A B

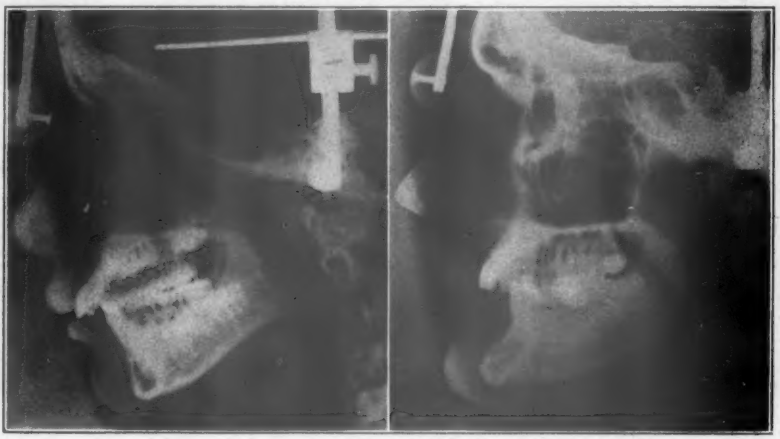
Fig. 4.—A, roentgenogram of skull in Figure 3; B, that of another well-proportioned skull with good occlusion. In both, the prominence of the zygomatic or key ridge is outlined with wire. The ridge descends to cover the mesiobuccal root of the maxillary first molar in B, but covers the distobuccal root in the skull known as "Old Glory."

Perhaps the mandibular incisal relationship shown in Figure 4, B is more acceptable than that in the textbook illustrations. In this skull, the incisors hold a relationship similar to those in Broadbent's illustration of "normal developmental growth of the face" (Fig. 10), which is an accepted normal.

In studying this mandibular incisal relationship of the cases in Figures 5

through 9, the following observations were made: In Class III deformities, the mandibular incisor teeth are usually in anterior relationship (Fig. 9), while, in Class II, Division 1, they may be either anterior or posterior (Fig. 5, A and B); but, in Class II, Division 2, they are usually posterior (Fig. 8). In Class II, Division 1, a distal relationship of the teeth is believed to be the result of narrowing of the upper denture, exaggeration of the curve of Spee and a close bite (Fig. 5, B); while the same condition in Class II, Division 2 (Fig. 8), may result from locking due to the lingual inclination of upper incisor teeth coupled with a close bite. But what implication does this relationship have in treatment?

Certainly, if these mandibular incisor teeth are in anterior relationship, as in Figure 5, A, anchorage should be rigidly observed to prevent any further anterior axial or bodily change in their position. However, if these teeth are as in Figure 5, B, it might be advantageous to allow anterior movement, with preservation of correct axial inclination.



A B

Fig. 5.—Roentgenograms of two cases in Class II, Division 1, Angle. In A, the mandibular incisors hold the usual relationship to the menton. In B, the mandibular incisors are distally from the menton, or bony chin point.

MANDIBULAR RELATIONSHIP TO THE SKULL AND CONVENIENCE BITE

The lingual inclination of upper incisor teeth before mentioned may cause a mandible of normal size to develop in a distal relationship to the maxillae (Fig. 7) or to assume a distal position or convenience bite.[12] Some doubt this, but Goodfriend[13] and others have pointed out this posterior relationship of the condyle in overclosure of the mandible due to sudden loss of posterior tooth support; while still others have suggested this development in a distal relationship as the result of growth failure or pressure which might inhibit or distort the downward growth of the temporal bone. Diamond[14] reminds us that "during the first five years of life, there occurs a downward growth of the temporal bone into which the condyle head of the ramus is articulated." If the downward growth of the temporal bone does not occur, the glenoid fossa would be situated higher than normal in the skull. If, then, the condyle developed in its usual relationship to the fossa, the entire mandible

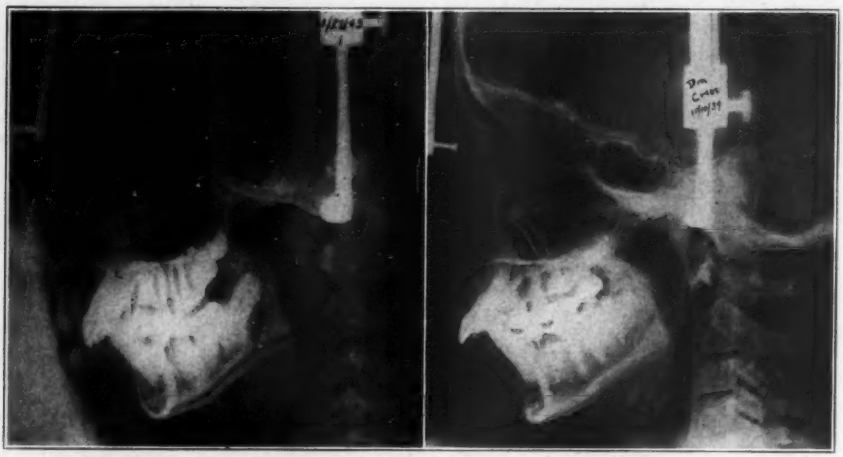
would be higher than normal or too close to the upper jaw.

Brodie,[15] discussing the Angle classification of malocclusion, states, "There are only three positions which the jaws may assume in relation to each other; namely, one in which the lower jaw is normal in its anteroposterior relationship to the upper; one in which the mandible is posterior, and one in which it is anterior." Actually, there are three additional positions; namely, one in which the lower jaw is too close to the upper, as in close bite or overclosure; one in which it is too far below, as in open bite, and one in which it is swung to one side, as in cross-bite.

If the jaws or dentures are incompatible in size or shape, or if there is tooth interference, the mandible may be caused to assume an abnormal position or convenience bite to permit complete closure or better masticating function, or both.

The determination as to whether the patient is employing a convenience bite is of prime importance to diagnosis. The following case description (Fig. 11, A and C) exemplifies this statement:

A boy, aged 14 years, was brought in by his mother, who was depressed because an orthodontist told her that her son's was the worst case of prognathism that he had ever seen and he did not feel competent to correct the condition. He explained that ordinary orthodontic procedure would not suffice and that resection of the mandible was the only alternative. At first sight, the condition did look severe, but, as the boy sat relaxed in the chair, the deformity seemed to disappear. Since the upper and lower teeth are separated in a relaxed state, tooth interference that forced the mandible forward upon closure was immediately suggested. When the patient was asked to close the jaws, the result was a quite severe Class III deformity, as shown in the roentgenogram Figure 11, but when he followed instructions to close with the lower incisor teeth back of the upper, the result was a complete elimination of the Class III facial deformity, as shown in the roentgenogram Figure 11. The occlusion was not correct in either closure, but was greatly improved in interdigitation and efficiency when the mandible was back. The patient was unable to explain why he always used the forward position. It was suggested that he form the habit of biting in



A B

Fig. 6.—Roentgenograms of two cases in Class II, Division 1, Angle. The mandibular incisors hold a rather usual relationship to the menton, or bony chin point. In B, the mandibular body is very short anteroposteriorly.

the posterior position, which he has done with complete comfort.

The assumption that the patient was using a forward convenience bite was confirmed when the profile roentgenograms were secured. As can be seen in Figure 11, the condyle is in an unnatural forward relationship when the mandible is closed in the forward position, but, when the mandible is back, the condyle is in the normal relationship. While the profile roentgenograms do not show the condyle relationships as much in detail as an accepted roentgenogram of this joint, they nevertheless serve very well. After correct diagnosis, the only treatment found necessary for this patient was to bring the upper and lower dentures into acceptable equilibrium.

Fig. 7.—Roentgenogram of case in Class II, Division 1, Angle. The mandibular incisors hold a rather usual relationship to the menton, or bony chin point. The mandible seems to be held in distal relationship to the skull by the vertical position of the maxillary incisor teeth.

The implication of a diagnosis of mandibular malposition is, as to treatment, obvious. Remove the cause and the mandible will revert to its natural position. This is comparatively simple if malposition is due to tooth interference, but is considered difficult, if not impossible, when malposition is due to an abnormal size and form of the maxillae or, more particularly, the mandible.

We cannot discuss all of the relationships and conditions that must be known to make a complete diagnosis, but a few others can hardly be omitted from this analysis. The comparative size of the teeth, face and cranium and the size and shape of the mandible must be considered in diagnosis and treatment.

FACIAL RETARDATION RELATIVE TO CRANIAL AND TOOTH DEVELOPMENT

Zuck,[16] in discussing growth, says: "Owing to the fact that the face is growing more rapidly during infancy when conditions of disease or undernutrition are most liable to be encountered, it is the face which displays, perhaps more than any other part of the body, the effect of these adverse influences." Figure 12, A illustrates the selective effect of malnutrition on the facial growth of a 6-year-old girl.[17] The growth of the face has been greatly retarded in all dimensions. This retardation in the vertical and anteroposterior dimensions is shown in Figure 12, B. Here, the tracing of the profile roentgenogram of the retarded child is superimposed on that of a well-developed child of the same age. The selective retardation of facial growth is in sharp contrast to the cranial development, which is almost identical in volume to that of the well-developed child. As is usually true, the teeth also are of average size and, therefore, badly jumbled. A recent roentgenogram of this girl at age 10 shows this same retarded condition of the face as compared with the face of a well-developed girl of the same age. This indicates either that the cause has not been removed or that the facial growth, having been disturbed at the time when these centers were most active, cannot catch up. The face will, therefore, always remain small. While the discrepancy between tooth size and facial growth is extreme in this case, a similar, but less severe disharmony is found in many cases of deformity with which the orthodontist must deal.

Fig. 8.—Roentgenograms of two cases in Class II, Division 2, Angle. The mandibular incisors appear to be held in distal relationship to the menton, or bony chin point, possibly as a result of the close bite and lingual inclination of the maxillary central incisors.

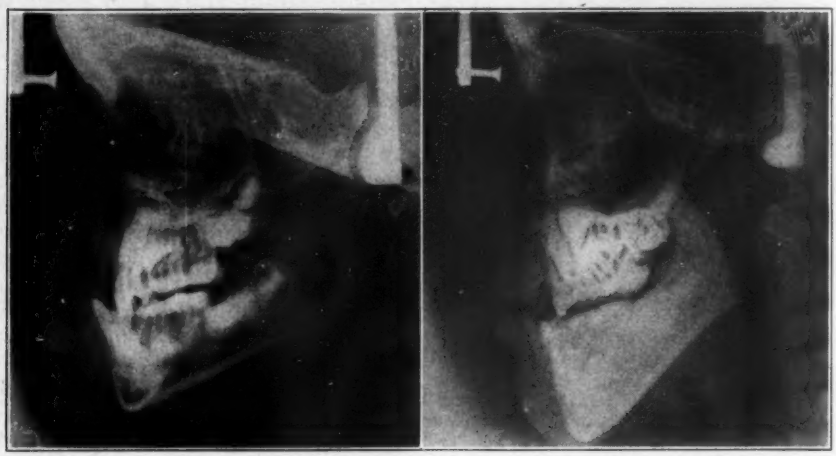


Fig. 9.—Roentgenograms of two pronounced cases in Class III Angle. The mandibular incisor teeth hold a rather usual relationship to the menton, or bony chin point, but are farther forward than in most Class II cases. The contrast in gonial angles is evident.

The implications for treatment revolve around the problems of judgment and orthodontic limitations. To extract or not to extract—that is the question. Strang,[3] in the new revised edition of his "Text Book of Orthodontics," subscribes to the Tweed philosophy of treatment, which, in turn, accepts the theory advanced by Grieve that certain cases of deformity "exemplify such disharmony between tooth material and jaw growth that the extraction of teeth is essential for the production of a stabilized end-product and harmony of facial lines." The study of cephalometric roentgenograms has changed this theory of Grieve's

into an acceptable fact, especially in such cases as the malnutrition just discussed. (Fig. 12.) What possible chance would there be to aline all the teeth in this case in any semblance of normal occlusion, let alone establish an acceptable equilibrium with the basal bones, except by extraction, unless the face could be induced to grow? Since, as yet, the latter alternative seems only a remote possibility, we shall have to assume that, for treatment of cases in general, the best compromise will have to be the goal. In some carefully selected cases, that compromise would be extraction.

We may ask, have orthodonic limitations been due to the fact that further growth of the basal bones cannot be induced, or is it that the methods em-

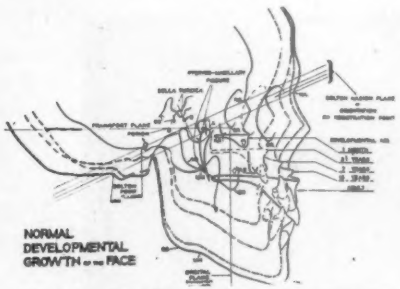


Fig. 10.—Broadbent's chart of normal dentofacial development from Bolton study records. The relationship of the mandibular incisors to the menton, or bony chin point, in this illustration should be that usually expected in normally developing facial structures.

ployed are at fault? In the past and at present, the mechanics of orthodontics have centered around the dentures, because we have been thinking too much in terms of malocclusion of the teeth. Perhaps in the future, with acceptable dentofacial equilibrium the goal, mechanics may extend to the basal bones themselves and thus assure that, if stimulation can cause growth, the structures that need stimulation will receive it. Perhaps we have too long attempted to stimulate basal bone growth through the medium of the teeth, obtaining, for the most part, only alveolar bone change. Cephalometric analysis of treated cases has made it clear that simply bringing the teeth into correct interdigitation, or what some consider normal occlusion, does not necessarily result in the desired change in the basal bones. In any event, direct stimulation of these bones, if it were possible, might bring about some amazing results.

MANDIBULAR SIZE AND SHAPE

There seems to be proof that the wrong kind of force brings about changes in the basal bones. Brodie[15] shows the effect of arrest of growth at the head of the condyle in the condition illustrated in Figure 13. This failure of condyle growth, he explains, "prevents lengthening of the ramus, and so the mandible, unable to move away from the actively growing upper jaw, becomes warped just in front of the angle . . . and the mass of the tongue assists in bending this jaw downward in a rotary manner." Thompson,[18] in discussing asymmetry of the face, mentions that even the quite stable gonial or mandibular angle can become more obtuse on one side than on the other. This all implies that forces generated within the head are capable of deforming the various basal bones of the face.

Now, we may ask, is it possible mechanically to restimulate to growth activity a static growth center or to prevent warping of the growth pattern of the basal bones? These questions have not been answered nor, so far as is known, have any experiments been attempted wherein force was applied directly to the basal bones. At least, the warping might be partially or entirely prevented if mechanical treatment were instituted in time; but suppose the warping has occurred before the patient is seen: can such a basal bone be reshaped? Present methods do not indicate this possibility,[19, 20] and Thompson[18] states that, in

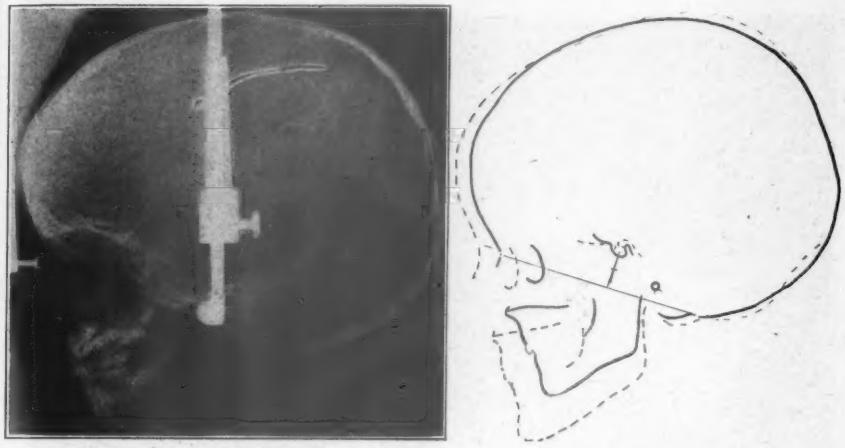
A B

C D

Fig. 11.—Malposition of mandible, or convenience bite. A, habitual forward mandibular position taken by patient, with accompanying forward displacement of the condyle. B, normal mandibular and condyle positions obtained in biting back as instructed. C, occlusion when mandible is in forward position. D, improved occlusion when the mandible is back in normal relationship to skull.

asymmetry of the face, "Orthodontic treatment may straighten the teeth, but it will not straighten the face"; that is, by correcting or attempting to correct the occlusion. What would result if, in addition, we might direct our forces upon the basal bones? Until some of these questions have been answered, the least we can do is to consider basal bone deformities in diagnosis and in treatment.

In Figure 14 are roentgenograms of two cases with almost identical dental deformity, but of great dissimilarity in the form of the mandibular basal bone. While the mandibular form approaches the normal in case B, in case A the gonial angle is quite obtuse, the ramus very short and the neck of the condyle



A B

Fig. 12.—Selective maldevelopment, in head of child, supposedly result of malnutrition. A, roentgenogram showing small affected face and normal cranium. B, tracing of roentgenogram superimposed over that of normally developing child of same age to show small face and normal cranium. The teeth are average size.

long and extending unnaturally high above the coronoid level, as though it were reaching or stretching in an effort to maintain a normal relationship in the glenoid cavity. Most of this mandibular basal bone deformity in A was not discovered until the roentgenogram was obtained. It would certainly seem that this difference in mandibular size and form should be an important factor in the diagnosis and treatment of these two or any such dissimilar cases.

Better results might be more easily attained, where a warped mandibular pattern is found, if we were more certain of the possibilities with respect to desired changes in the basal bone. Until the limitations are better defined, it may be more important to know what constitutes an acceptable equilibrium and how possible it is to place the dentures and deformed facial structures, with which we have to deal, in relationships that would assure such an equilibrium.

That Nature can produce this state of equilibrium is evident in Figure 15, where the roentgenogram of the previously discussed case, with the warped mandibular pattern and malocclusion, A, is compared with a skull, B, having an almost identical mandibular pattern but an ideal occlusion. What Nature has done in case B we might also accomplish

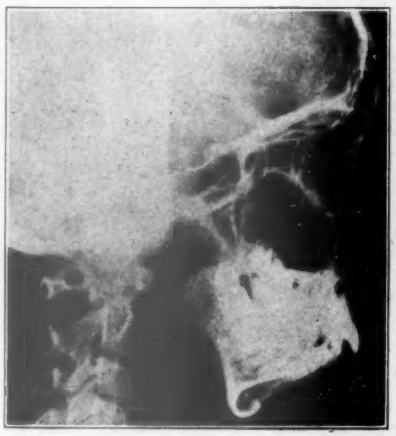
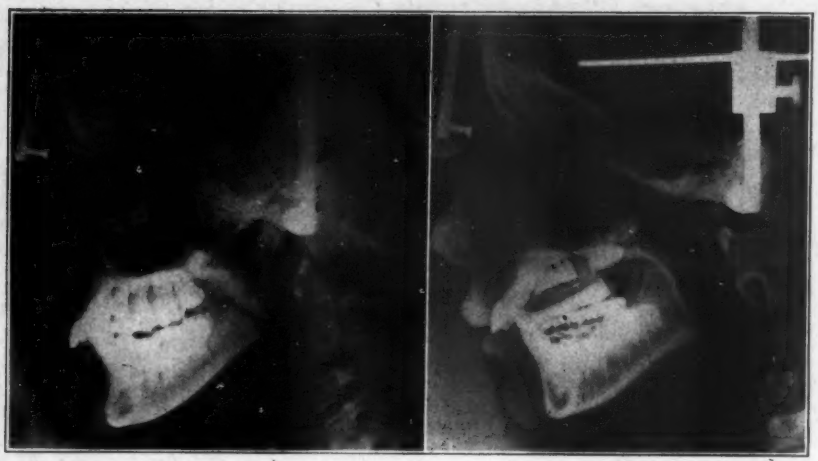


Fig. 13.—Roentgenogram showing effect of arrest of growth at head of the condyle on mandibular development. (Fig. 117 from Gordon's text.)



A B

Fig. 14.—Roentgenograms of two cases in Class II, Division 1, Angle. The malocclusion of the teeth is similar, but, in A, the gonial angle is obtuse, the ramus short and the neck of the condyle long and inclined distally; in B, the mandible is normal in form and size.

A B

Fig. 15.—Roentgenogram of patient and photograph of skull having almost identical abnormal mandibular patterns. In A, there is a class II Division 1 malocclusion of the teeth, while, in B, the occlusion is normal or in acceptable equilibrium. (B from Atkinson, Am. J. Orthodontics, 25:1133, 1939.)

orthodontically if we but knew the changes necessary to bring these various relationships of the teeth to the jaws, face and cranium into an acceptable equilibrium.

SUMMARY

Cephalometric methods have contributed much to present orthodontic interpretation and thought.

The terms "normal occlusion" and "malocclusion," unless defined to include face and cranial relationships, are liable to have a limiting influence upon orthodontic diagnosis and treatment.

In many of the textbook illustrations,

normal or ideal occlusion would appear as a bimaxillary protrusion if such a result were produced orthodontically in white patients.

The goal of orthodontics can no longer be the prevention and correction of malocclusion of the teeth alone, except where this will also prevent or correct deformity of other structures of the head to produce an efficient and pleasing result and secure adequate retention of the newly established occlusion.

At present, a change in basal bone, if possible, is accomplished through stimulation derived from application of force to the teeth. In the future, when present methods fail, stimulation may be attempted by direct application of force to the basal bone.

Where ideal basal bone change is impossible or impractical, an approach to an acceptable equilibrium between the structures of the dentures, face and cranium may bring about a satisfactory result.

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SODIUM DILANTIN GINGIVAL HYPERPLASIA

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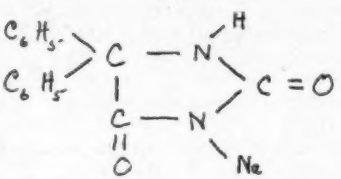
SODIUM dilantin has by now come into fairly general use in the treatment of epilepsy. It appears to be one of the most effective anticonvulsant drugs yet employed, and, while it has certain shortcomings, it is regarded as a means of salvation to the epileptic, who heretofore has been forced to depend largely on the barbitals. With it, the average victim of epilepsy is enabled to, at least partially, take or resume his place in society, in accordance with the caliber of his physical and mental equipment.

A curious oral reaction to the drug has been noted in most of the larger hospitals and clinics in the last three or four years. It is remarkable in that a specific body tissue shows abnormal overgrowth in response to administration of a particular drug.

Herewith, we wish to present some clinical data collected over a period of three years in the Boston City Hospital where, under H. Houston Merritt and Tracy J. Putnam, sodium dilantin was developed and first used in 1937.

Within a year after its introduction, the first striking mouth reaction was observed in a patient in the oral surgery department of the hospital. The appearance of the gingivae in a routine case of "bleeding gums" caused considerable interest. At intervals thereafter, the more pronounced cases of hyperplasia of the gingivae were sent to us and surgically treated, with varying degrees of success, by several members of our staff. Early in 1941, we began to attend the epileptic clinic, and all cases showing gingival hyperplasia were examined. We soon found that a more comprehensive study was indicated, and were given permission to examine all epileptic patients receiving sodum dilantin and to attend the clinic weekly. A chart was devised and a surgical technic was standardized. Considerable data have been assembled. War-time exigencies preclude continuing the present survey, but we feel that a report should be made, since our findings may be of value to other observers. This is not a final report.

The chemistry of sodium dilantin has already been covered in THE JOURNAL and we shall not repeat, except to point out that it is an alkaline drug, produced synthetically, with the formula:



A total of 244 patients have been observed over a period of nearly three years. Sixty per cent of these were male. The youngest patient under sodium dilantin treatment was 3, the oldest 69 years. Hyperplasia began at 5 years, rose sharply from 9 to 12, then more slowly, to a peak at 24 and fell quickly to 35, after which cases were scattered. The hyperplasia age curve followed the overall age curve roughly with the exception that the peak for all epileptics was reached at age 17, while the peak of all showing hyperplasia appeared at 24. No

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extreme overgrowth was observed beyond the age of 30 (Fig. 10).

GROSS APPEARANCE

The initial change consisted of a slight inflammation of the interdental papilla, followed by a pinhead tissue extrusion. (Fig. 15.) This pinhead extrusion was followed by other areas becoming small hypertrophied bulbs, almost pendulous and very often bleeding easily on brushing or eating. The mass now became a pendulated, lobulated papilla (Fig. 4). By the time this last stage was reached, most patients complained of discomfort. From this point, it took on the aspect of a generalized hypertrophy, in most cases circumscribing the labial or buccal surfaces (Figs. 2 and 14) of the teeth in the area involved. In some cases, the lobulated character persisted, the teeth showing through a cleft in the tissue (Fig. 1). The normal level of the gingival attachment to the tooth was not disturbed, regardless of the amount of overgrowth. Where the excess tissue interfered with chewing and brushing, there was some bleeding, but very little. In a very few cases wherein no attempt had been made to keep the mouth clean or to massage the gums, there was a general hyperemia of the entire hyperplastic area. As a group, these cases showed a remarkably good gingival color. We saw few cases with clinical signs of infection and none with breaking down or sloughing of tissue.

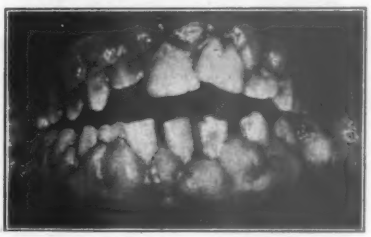

Fig. 1.—Open bite and irregular teeth. No attempt had been made to brush the teeth. The mouth was very dirty. There was some stasis of blood, but no true gingivitis or gross infection.

DOSAGE

Patients were given from 1 to 6 capsules (1½ grains) of dilantin daily as their needs dictated—enough to control seizures. The neurologic department provided them with sufficient amounts of the drug to last for two to ten weeks. Cases were reviewed at these intervals and the dosage was changed as indicated. Cases observed had been under treatment from one to four years.

In a few cases wherein the drug was discontinued, the hyperplasia gradually disappeared. Excess body hair, growth of which seemed to have been promoted by dilantin therapy, also disappeared.

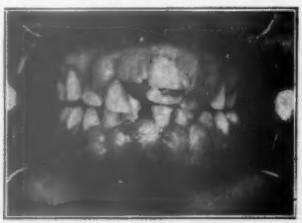

Fig. 2.—Hard and quite firm hyperplastic tissue. The spacing of the lower teeth is to be noted.

An increase in dosage sometimes quickly precipitated a gingival hyperplasia in patients who had long been under treatment with no previous mouth changes recorded. Arrested or static cases were sometimes again stimulated to growth by an increase in dosage. Many cases under dilantin therapy for long periods showed no change. The length of treatment did not appear to influence the hyperplasia (Fig. 12). Several cases of extreme hyperplasia developed after only three months' treatment. There was no relationship between the amount of sodium dilantin taken and the number or severity of the oral reactions (Fig. 13).

MOUTH HYGIENE

All cases were listed as good, fair or poor; an arbitrary classification. Thirty-five per cent were good, 38 per cent were poor and the remainder were fair. The relative cleanliness of the mouth did not seem to influence the hyperplasia.

CARIES

Examinations were made in a good light with throat sticks only. All cases were listed as free (no visible cavities), moderate (not more than three cavities) and extreme (more than three cavities). On this basis, 23 per cent were found to be caries-free, 60 per cent had moderate caries and only 15 per cent had extreme caries. This was an amazingly low incidence of caries, especially in consideration of the fact that these patients were from an underprivileged group. Persons having experience in low cost or free clinics in large cities will especially appreciate the significance of these figures.

Fig. 3.—Case showing growth of tissue over contact points. Here, some of the lingual tissue is involved and should be removed. The upper left cuspid is "buried." There is bleeding in the lower central incisor area.

PERIODONTOCLASIA

Seventy-six per cent of the cases were entirely free from periodontal disturbance. Only eleven cases showed well-defined changes in the supporting structures. The dilantin hyperplasia was readily differentiated clinically from the usual periodontal changes. Local irritation only slightly increases the proliferation, if at all. Poorly fitting crowns, fillings with overhanging gingival margins and abutting teeth on dentures and bridges were responsible for no significant changes. The reaction to the added irritation to the sum total was roughly comparable to that of normal mouths to the same irritation. The presence on the lingual surface of lower incisors of large deposits of calculus, which would certainly be considered a source of irritation, caused no marked overgrowth, while the same teeth frequently showed extensive hyperplasia on the labial surfaces, where little or no calculus was present. The percentages of upper and of lower teeth showing hyperplasia were equal, and the problem of calculus as a contributing factor in upper anterior teeth is very slight. We believe that local conditions, except for lack of occlusion or brushing, are relatively unimportant in these cases.

Fig. 4.—Open bite with irregular anterior teeth. The gingival tabs could be lifted away from the teeth, a deep crevice thus being exposed. The tabs were firm and resilient.

OCCLUSION

Seventy-five per cent of all arches were in Class I malocclusion. There were nineteen cases of markedly open bite (7.7 per cent), two of closed bites, two of edge to edge and three of overbite. All cases of open bite showed marked hyperplasia of the gingivae.

ARCHES

In spite of the high percentage of satisfactory occlusion, 30 per cent of all

arches showed very marked irregularity in tooth alinement, spacing, tipping, crowding and rotation. Most of the irregularities were in front of the first molars.

WEIGHT AND HEIGHT

As a group, the patients were of medium weight and height. Three classes each for weight and height showed no marked deviations.

RACIAL EXTRACTIONS

All the European nations were represented in all combinations, in about the proportion in which they are found in the city. There were only three Negroes in the group in spite of the large Negro residential area bordering the hospital. There were no orientals. There are many nearby, but they rarely make use

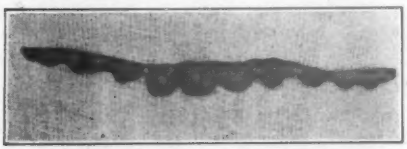

Fig. 5.—Section of tissue removed from buccal and labial surfaces of the upper teeth. This can usually be removed fairly intact.

of the clinics. There were but few blonde or light complexioned patients, the group being predominantly dark. We were early impressed with the great number of hairy persons and began to record any deviations from the normal. We found that 25 per cent of the group had an excess of hair on the forearms, brows and face, both sexes and all ages. A recapitulation of the figures shows that 78 per cent of these cases also showed gingival hyperplasia, while only 54 per cent of the entire group showed gingival changes.

DIETS

Diets, in all cases, were carefully followed at the outset. We were surprised to find that, as a group, the diet was much better balanced than might be expected; in fact, considerably better than the general average. Nearly all of the group expressed a distinct preference for fresh fruits and vegetables. In this connection, it is interesting to note that Dr. Merritt has done considerable work in administering vitamin C in these cases. He was able to cause a rise in the blood plasma vitamin C content from 0.22 to 1.12 mg. per hundred cubic centimeters, with no effect on the gingival hyperplasia. As a group, the vitamin C blood content was the average for all clinic patients. We were at a loss to account for such a well-balanced diet for this group as a whole, concluding that it must in part be due to a natural self selection.

Fig. 6.—Gingivae of man, aged 22, who had been on dilantin therapy for four years. The gingivae had been resected with the radio knife one year before. The recurrent growth is identical with the original in appearance. (Compare Figs. 7-9.)

GINGIVAL HYPERPLASIA

In the case of gingival hyperplasia, it was necessary to set up our own classification, based on our clinical observations. We divided the progress of the hyperplasia into four stages as noted under "Gross Appearance." The hyperplasia was predominantly in the anterior region, on the labial and buccal surface, as shown in the diagram.

In many of the more advanced cases with extreme overgrowth of the gingivae, the breath was fetid and there was a

quantity of fermented detritus in the deep crevices between the gingival overgrowth and the teeth, which the patients seemed unable or unwilling to keep clean. Systematic, careful brushing became too painful an ordeal to be followed. In the late stages, it is interesting to note, there was not a true gingivitis until the dosage of dilantin was increased at this stage, after which there was again a primary gingivitis. It is also of interest that not a single case of Vincent's angina was found in the entire group, although local conditions certainly invited infection.

We observed many edentulous cases and no hyperplasia in any of them. Several patients wearing full upper dentures showed hyperplasia around the natural lower teeth, with none on the upper edentulous ridges in the same mouth. In the presence of partial dentures with anterior teeth abutting directly on the ridge, hyperplasia appeared around these as around the natural teeth. This was seen in three cases. A marked overgrowth appeared above the facings on fixed anterior bridges in several cases, but the reaction in these cases was not confined to the restoration area, being equally evident around the natural teeth.

Fig. 7.—Exposure of lower teeth, by trimming, down to alveolar crest in case shown in Figure 6. In early cases, the tissue was trimmed back farther, with less satisfactory results than with conservative treatment. Sponging controls bleeding.

TREATMENT

When the hyperplasia has progressed to the extent that the patient complains of difficulty in eating hard foods, and also in a few cases for cosmetic reasons, we advise surgical removal of the excess tissue. This is done under a complete sterile technic, only one-half of the mouth being treated at a time, either the upper or the lower. The patient rinses thoroughly with metaphen 1:2,500, holding it for three minutes in the mouth. The face is scrubbed with green soap, followed by metaphen 1:500. The operator and assistant both scrub and use sterile cap, gown, mask and gloves. A sterile head wrap and drape are used, leaving only a small part of the patient's face exposed. Our choice is a local anesthetic, procaine with epinephrine 1:60,000.

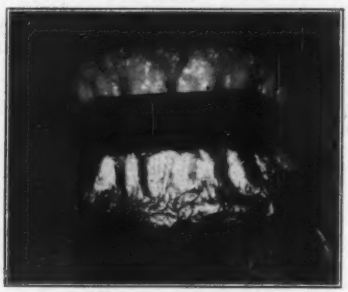

Fig. 8.—Use of adhesive tinfoil coated with zinc oxide medicated paste and pressed well over teeth, labially and lingually. The patient is asked to bite into the tinfoil while it is still soft to establish occlusion for ease in eating. The tinfoil is left on for several days.

A horizontal continuous incision is made just above the hyperplasia area, around the limits of the tissue to be removed. Another continuous incision is made around the teeth going well into the interproximal spaces and freeing the gingival attachment to the teeth. With a periosteal elevator, the entire strip of tissue can then be removed, usually intact. Any small tabs remaining in the

interproximal spaces may be removed with periodontia knives. In the more extreme cases, where the tissue has grown over the occlusal or incisal edges, obscuring the contact points of the teeth, it is often necessary to trim away a strip of the lingual tissue at the same time. Considerable deposits of calculus are apt to be found, frequently half way down the labial surfaces of the incisors. The teeth can be easily scaled at this time.

The area is sponged as dry as possible, the teeth and incised areas are covered

Fig. 9.—Case completed four weeks after resection of lower gingivae. There are calculus deposits high up on the upper teeth. (Compare Figs. 6-8.)

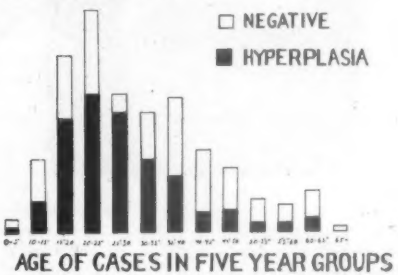

Fig. 10.—Ages of patients in five-year groups. The ages ranged from 3 to 69, with reactions at all ages. The percentages at various age levels were not significant. The most severe reactions occurred between the ages of 15 and 30.

with a zinc oxide-eugenol resin cement and the whole is covered with adhesive tinfoil pressed in tightly. This is left on for three days, at which time organization should be well started. This does not seriously interfere with chewing.

As soon as possible, the patient should be encouraged to start brushing and massage with finger tips and rubber massage points. Diligent care in brushing and massage can do much in preventing

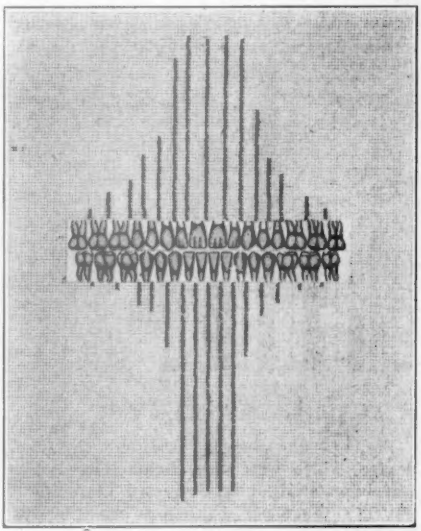

Fig. 11.—Area in which hyperplasia appears. The length of the lines indicates the actual number of cases. Very few cases showed involvement on the lingual aspect. Gingival overgrowth was seen largely on the labial aspect of the anterior teeth.

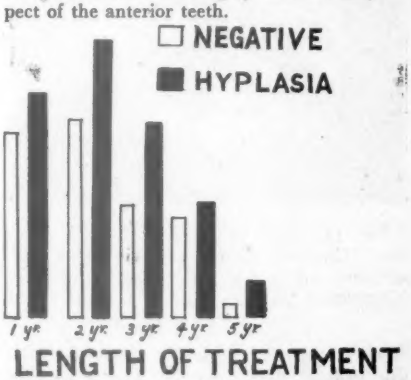

Fig. 12.—Length of treatment, which did not affect reaction. The proportions were roughly the same for all treatment periods.

or at least slowing up the advance of the hyperplasia, especially its recurrence.

Practically all of these cases develop the condition again unless the dilantin is discontinued.

In some of our original cases, the patients were operated on with the radio knife. This did not work so well in our hands as the usual surgical procedure.

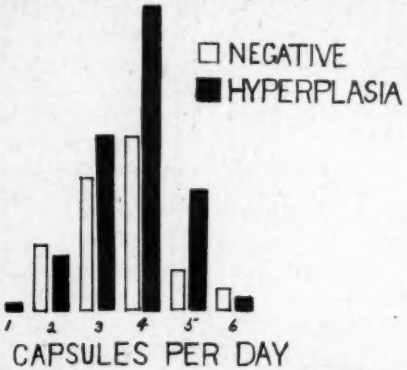

Fig. 13.—Hyperplasia increases with larger dosage, which were very slight. The dosage was immaterial unless increased beyond the patient's tolerance, which was not constant for either the individual or the group.

Fig. 14.—Extreme overgrowth with open bite. The patient, a young girl, had been operated on twice, with early recurrence. (Compare Fig. 15.)

Recurrence seemed more prompt with the use of the former. Many of the epileptic patients are extremely apprehensive, and the odor and sound of the radio knife seemed to excite them to the point of refusing to let us complete the case.

The epileptics as a group did not react well to local anesthetics. Procaine is a convulsant. These patients were sensitive to the adrenalin content and a few reported seizures on the day following the operation. A certain amount of this reaction may well have been due to nervous exhaustion or plain shock. Patients were advised to take an extra capsule of dilantin after the operation to partly compensate for this condition, with good results.

Microscopically, the cases were fairly uniform in appearance. There was a general aspect of chronic inflammation. The epithelial layer was fairly thick with considerable proliferation and but few or no mitotic figures. There was a considerable downward growth of the basal layer of epithelium into the underlying stroma. This took place in long strands, which frequently divided or split at the

Fig. 15.—Condition following third operation in case shown in Figure 14, with careful brushing and massage, at the end of one year. There were only small points of hypertrophy visible.

ends with "rete peg" and epithelial "pearl" formation. The two latter were most characteristic of the sections. The connective tissue layer also showed some proliferation, with collagen bundles present. There was evidence of chronic inflammatory cells in most of the sections, and plasma cells and lymphocytes. Multiple capillaries were present in many sections, varying, of course, in the degree of gross inflammation present in the

tissue sectioned. Here, we had a rapid proliferation of tissue, prone to quick recurrence. As several pathologists suggested that malignancy could not be dismissed entirely, we proceeded to transfer bits of hyperplastic tissue directly into the anterior chamber of guinea-pigs' eyes, where it could be watched. This, the newest and most convenient method of watching such transplants, was done with both new and recurrent cases. At the end of six weeks, the transplants had disappeared completely and we concluded that the tissue was not malignant. (Figs. 16 and 17.)

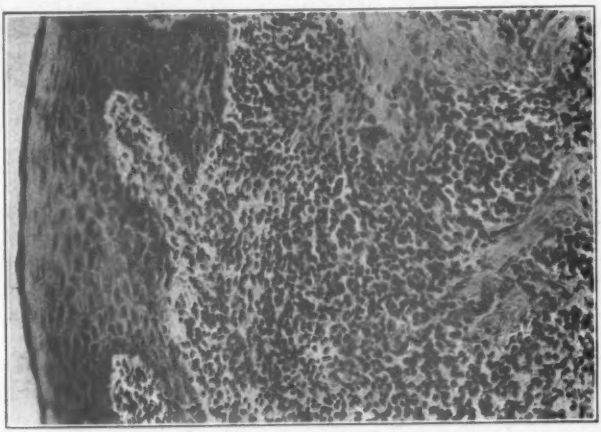

Fig. 16.—Hyperplastic tissue transplanted into anterior chamber of eye of guinea-pig, for observation.

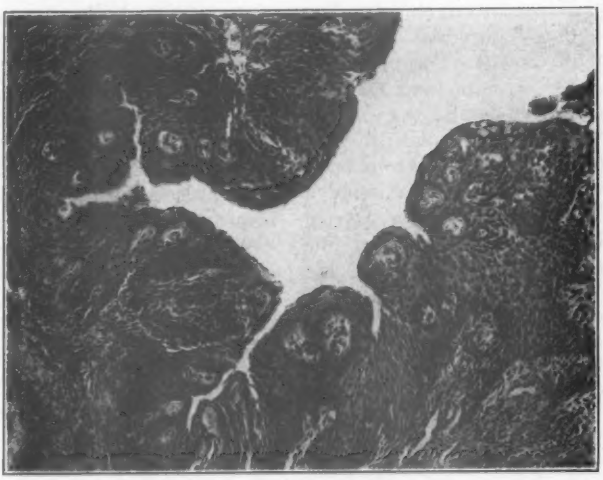

Fig. 17.—Hyperplastic tissue transplanted into eye of guinea-pig, for observation.

At the start of the survey, complete dental roentgenograms were made of all the more advanced cases. These proved

again that we were dealing with a group singularly free of dental defects. The teeth were nearly caries free; there was no evidence of periodontal lesions, and the bone was perfectly normal in character roentgenographically.

It was early noted that there were an unusual number of cases of open bite, to date nineteen, many of them extreme. These cases showed the most marked hyperplasia around the anterior teeth, which seemed prone to recur quickly. This may have been due in part to the fact that these patients were unable to bite and chew normally in the anterior region, with a subsequent lack of normal massage from mastication. The fact that these patients rarely kept their lips over their teeth, leaving the anterior gingivae exposed to the air, may have had some influence on the hyperplasia. This, however, is pure conjecture.

In some of the early operative cases, we were very conservative, taking merely the more predominant overgrowth. The tissue reappeared quickly. A more radical removal was resorted to, extending well above the hyperplasia area, into the edge of the mucosa. This procedure left rather large areas of bone exposed, and not only proved painful, but was also so slow in healing that patients were reluctant to start brushing and massaging as soon as they should. As a result, a new overgrowth was sometimes started in the interproximal spaces before the patients were again able to brush the teeth. We now keep well away from the mucosa, taking the thickened tissue only, just to its margin. Unquestionably, brushing and massage help greatly to retard the hyperplasia.

A few patients experience disagreeable systemic reactions to sodium dilantin therapy. New compounds are being tested and it is believed that use of some of the closely related drugs may eventually supplant dilantin therapy with its oral manifestations.

CONCLUSION

Dilantin hyperplasia occurs in 54 per cent of all persons taking the drug. Not age, sex, length of treatment or size of dosage, but rather the individual tolerance or sensitivity to the drug, determines the incidence of gingival reaction.

Clinical evidence points to endocrine disturbances in the background of a great number of these cases, but these cannot be clearly identified.

An intensive daily routine of vigorous massage with toothbrush and gum stimulators can check the gingival overgrowth in many cases. For the remainder and those unable to follow the massage, only repeated surgical measures or complete cessation of the drug therapy will remove the excess tissue.

Local conditions, open bite excepted, have little influence on the incidence or severity of the oral reaction.

At present, no other tissue in the body is known to react to the use of this drug.

A STUDY IN CASTING DENSITY

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A SERIES of tests were made to determine some of the factors in casting soundness. Certain conclusions are given herewith.

CONSIDERATIONS IN SPRUING TECHNIC FOR INLAYS

Most of us who cast inlays may know of the importance of sprue diameter, length, shape and place of attachment in the process of preparing and making a casting. It is realized that this phase of the subject is not in a new field; but often we need to be reminded of the facts, some of the simple truths. The accompanying macrophotographs are offered as additional graphic evidence of the importance of and consideration that should be given the factors in sprue attachment in the casting of inlays.

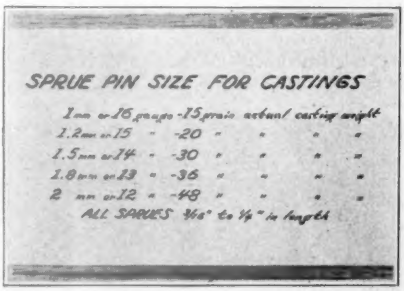
Practical evidence of deficiencies present when improper methods of treatment are used in this one phase alone can be given by photomicrographs of slight magnification. (Fig. 1.)

It is interesting to note that the specimens are examined under extremely low power magnification. This fact alone gives added significance to the picture that they present. This convincing story is told with the specimens magnified only 10 and 20 diameters. (Figs. 2-5.) Some specimens have been given greater magnification only to make the picture more impressive.

From these tests, it was concluded that a sprue attachment ranging in size from 12 to 16 gage (standard wire gage measurement) was best suited for the usual various weight inlay castings. What is thought to be the best combination in sprue size for the average Class III or Class IV inlay up to the large mesioclusodistal or complete cast crown has been found. Reservoirs aid in eliminating the porosity ordinarily encountered with small sprue pins. However, it is difficult to place a reservoir close enough to the pattern to be of benefit in eliminating the porosity from the "feeder" at the time of freezing the metal, and still have it far enough away from the pattern not to damage it.

The accompanying table acts as a guide in selecting the sprue size to be used for a complete range in weights of castings commonly made. Tests to produce castings of given weights with the accompanying sprue selected for the

MOST SUITABLE SIZE SPRUE ATTACHMENT FOR DIFFERENT CASTING WEIGHTS*



*Including castings from small Class III or IV inlay up to large type restorations for crowns and extensive inlay preparations.

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Read before the Dental Materials Group, International Association for Dental Research, Chicago, March 18, 1944.

weight resulted in castings of fine density with only occasional localized porosity at the place of attachment. The remainder of the casting was sound in all cases.

CRUCIBLE DESIGN

Another common casting problem is the possible effect on casting density of crucible former shape and design; which, of course, consequently affects the path that the molten metal follows and determines the shape of the sprue surplus. (Fig. 6.)

Fig. 1.—Three test castings of approximately same weight (38 grains) made with different diameter and length sprue attachments. Left to right: Sprue diameter, 12 gage (standard wire) or 2 mm.; sprue diameter, 15 gage (standard wire) or 1.5 mm.; sprue diameter, 18 gage (standard wire) or 1 mm. Specimens were given like treatment in casting, finely polished and etched with aqua regia to disclose deficiencies present.

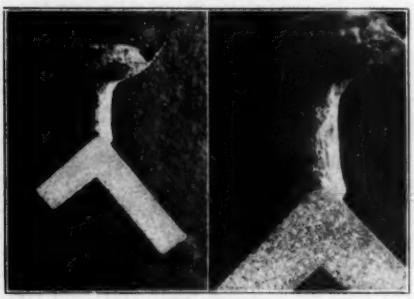

Fig. 2.—Left, ten diameter magnification of casting at left, Figure 1; right, twenty diameter magnification of casting at left, Figure 1; showing fine grain structure and uniform soundness throughout casting.

As a means of contrast, castings were made by using an exceedingly flat former and one of a particular long cone-shaped design. Specific gravity tests did not show that a consistently greater density is obtained by the use of the long cone-shaped former.

The sprue attachment diameter, length and shape were the same for all castings with measurements taken from the cone origin to the pattern proper for both types of crucible formers. They were one-fourth inch in length, 12 gage and of equal diameter throughout their

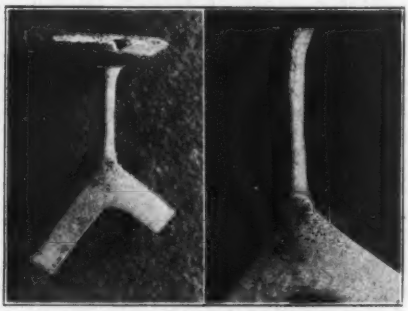

Fig. 3.—Left, ten diameter magnification of center casting, Figure 1; right, twenty diameter magnification of center casting, Figure 1; showing localized porosity at area of sprue attachment, due to inadequate sprue size for casting bulk.

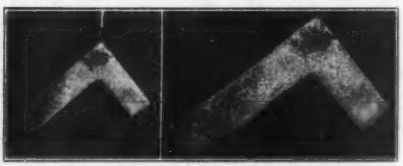

Fig. 4.—Left, ten diameter magnification of casting at right, Figure 1; left, twenty diameter magnification of casting at right, Figure 1; showing general porosity throughout casting, especially in longer extension arm, which is due to small size of sprue attachment for casting weight.

length. Casting weights averaged approximately 36 grains.

CHARCOAL CRUCIBLE

A method of embedding a charcoal rest in the investment was used with the pressure method of casting in which the metal was melted directly in the investment chamber of the ring. A liner of charcoal was made to act as a cradle for the metal in the centrifugal type crucible. (Fig. 7.)

At first, evidence seemed to suggest a more dense casting with the charcoal bed, and later figures gave returns that were not consistent. This idea has been abandoned as not having enough practical value to be used regularly. Figures varied from 14.60 with the liner or rest to 14.79 in specific gravity tests. Without the charcoal liner, they ran from 14.59 to 14.81, and the averages were not of great enough difference to have practical importance. The averages were 14.72 with the liner against 14.70 without the charcoal liner. This small percentage of increase does not warrant regular use of such a device in an attempt to obtain castings of added density.

RINGLESS CASTINGS

Castings made by the regular method of investment of the pattern, but removing the ring or flask before elimination of the wax and heating to casting temperature, are undersize when tested with steel dies for accuracy. A method must be used to compensate for the shrinkage of the mold, which is probably

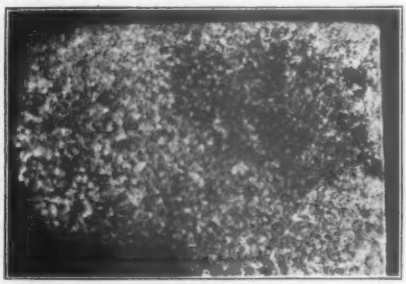

Fig. 5.—Fifty diameter magnification of casting at right, Figure 1; showing areas of extreme porosity and voids because of inadequacy of sprue attachment diameter for comparative casting weight.

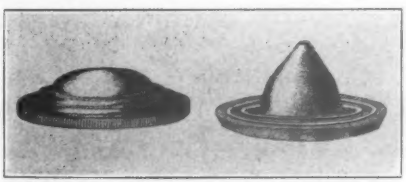

Fig. 6.—Crucible bases of extremely different design, used to determine effect of difference on casting density. A specific gravity test did not give conclusive evidence in favor of the high cone former as regards assuring greater density.

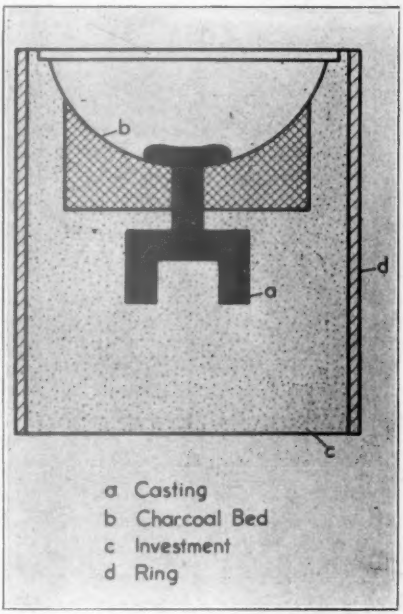

Fig. 7.—Charcoal invested bed acting as crucible while metal is heated. This method does not give a decided increase in the density of the casting over the conventional method of melting the alloy.

due to heat loss because of lack of protection from the ring. In using a regular water-powder proportioning system for investing and controlled heating temperatures in an attempt to give controlled setting and thermal expansion of investment, test inlays made without extra compensation were too small. It is thought that regardless of the rapid heat conductivity of the metal ring, it evidently must retard loss of heat from the core of the mold itself until the molten metal is frozen, as castings made by the same system and controls with the ring are not undersized.

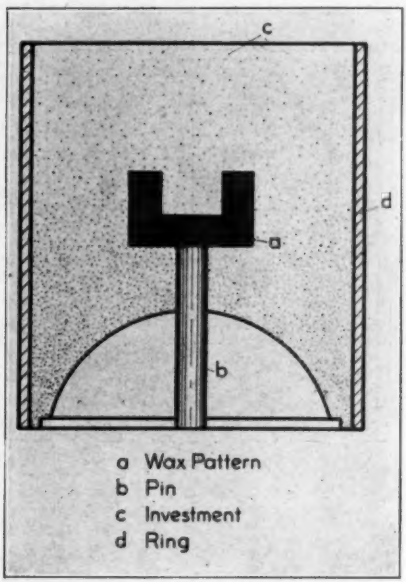

Fig. 8.—Arrangement in heavy vibration of investment in casting ring upsetting uniformity of investment mass, leaving uneven density from base to top of ring.

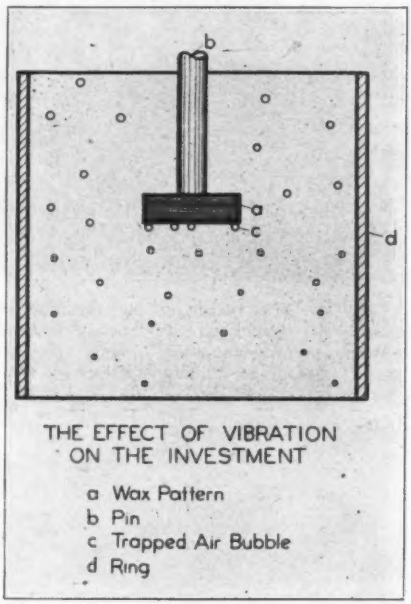

Fig. 9.—Ring sectioned to show trapping of air under invested object as vibration causes bubbles to rise straight upward.

EFFECTS OF VIBRATING WHEN INVESTING

The common practice of vibrating investment into the ring in the investing process is detrimental, destroying the uniformity of the investment from the base to the top. (Fig. 8.) Care has been taken to employ a certain water : powder ratio for consistency, but this consistency is disturbed if vibration is used. The investment at the bottom of the ring is more dense and should give greater expansion because of the proximity of the investment particles than in the middle or near the top surface. We may disregard the top portion, as it usually contains only the sprue attachment where accuracy of fit is not a factor, but, of course, the deeper portion carries the mold of the casting.

In the process of filling the ring or flask and vibrating before the painted pattern is inverted into it, the mass consistency of the investment is affected. Damage can also be done when the investment is poured around the painted pattern after the ring has been seated on the base or crucible former and then vibrated.

Vibrating as ordinarily done in the investing operation gathers minute air pockets to form larger air pockets and some of these find their way to the wax pattern and what is later to be the inside mold face or surface. The air pockets, upon vibration, rise in a vertical direct line to the top unless they meet resistance, which in this case is the wax pattern surface. In their path upward, they may be trapped under the wax and are unable to find their way around the pattern to the top investment surface. (Fig. 9.) This can be illustrated in a simple way by immersing a dry object in a beaker of water and noting the trapping of air that takes place on the bottom surface of the object. As another means of illustration, an investment mix may be compressed between glass plates in which a thin object is embedded. After vibration, it will be noticed that air bubbles have gathered on the under surface of the object and do not travel around it to the top edge of the glass.

Actual casting density may not be affected by vibration methods, but it has been established that the surface finish of a casting using heavy vibration is more irregular than when vibration is not used.

CASTING DESIGN

L shaped castings of equal weight, like thickness at the angle and similar pattern were subjected to stress. One group of castings were of sharp angle design and the others were prepared with a cove formation at the angle. An equal compressive pressure was applied to one set of castings. (Fig. 10.) A pull stress was given to the other group from each extension of the casting. In all cases of treatment of this kind, the castings with the cove formation at the inside angle withstood the greatest pressure and stress without distortion.

In commercial casting processes, the pattern is made with a cove or fillet at the angles where possible, for strength and casting soundness. The actual strength of a dental restorative material is not so important in some cases as it is in others and is given greater consideration in those castings carrying extra loads. Partial crowns may need more strength than their natural bulk permits; and, since teaching today is toward

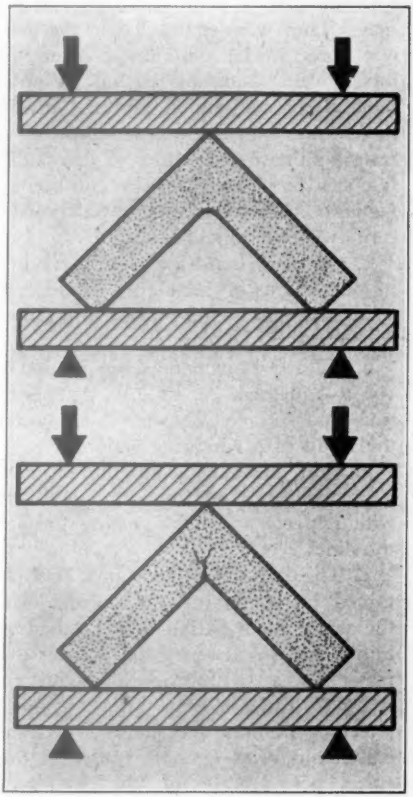

Fig. 10.—Diagram showing method testing cove and sharp angle design castings for strength. When equal compression was applied, the coved angle withstood the greatest load without distortion.

conservation in cavity preparation, the cove formation may be a means of obtaining extra strength when needed. The Hooper cove cutting bur is used in finish-

ing the cavity walls and reducing the sharp angle left by the regular bur.

HAND VS. MECHANICAL SPATULATION

The question of the advisability or necessity of mechanical spatulation is sometimes asked. Simple tests were made by placing specimens between two glass slides and compressing the investment to a thin film to show consistency of the mass. They were spatulated in the various ways to be described. After the mixes were made by several different methods of spatulation and the investment was set, they were subjected to transillumination, in order to detect differences or deficiencies in consistency. Definite and constant water : powder ratios were used in all cases.

1. Ordinary hand spatulation resulted in formation of numerous large and small air pockets in a massed or grouped formation throughout the slide.

2. With fast mechanical spatulation of 100 to 120 turns per minute, there were small pockets more evenly distributed, the result of a whipping action.

3. Slow mechanical spatulation gave a homogeneous and smooth investment with scarcely any light passing through the slides.

4. The best investment mix was obtained by combining the powder with the water by a sifting action; then an initial incorporation of the powder and water by a cutting motion with the spatula rather than the ordinary sweeping motion, and, finally, mechanical mixing with from forty-five to fifty turns per minute of the spatulator handle.

LOW VS. HIGH HEAT TECHNIC IN INLAY WORK

The question of the superiority of one of these two systems is often asked. Certain conclusions are as follows:

In tests made to compare the density or soundness of a casting when using low and high heat technic, it was found that there is a difference in surface structure. The low heat system which uses a burn-out temperature of 800 to 1000° F. gave a surface grain structure of greater smoothness than that of the technic requiring a temperature of 1300 to 1350° F. This was only a surface condition and probably this finding is based largely on the fact that the face surface of the investment mold may be broken down to some degree by the higher heat.

The internal casting structure, however, does not seem to be affected, and it was found that the results obtained with the high-heat system did not show penetration of any appreciable depth within the body of the casting. The subsequent polishing would remove the surface roughness in any case. It can then be concluded that since the surface of the casting may be removed, and since internal structure is not affected, higher heat technics cannot be considered detrimental to the soundness of a casting.

In conclusion and with reference to the opening remarks relative to reminding ourselves of certain simple truths, it is hoped that, along with other details, the important steps of spruing, spatulating and investing may be given the consideration that they deserve in cast inlay technic.

GINGIVAL AND PERIODONTAL DISEASE

DONALD A. KERR,* D.D.S., Ann Arbor, Mich.

PERIODONTAL disease is as old as the recorded history of man, nevertheless it is a disease of civilization. It becomes more prevalent as man becomes less primitive. The use of refined foods and the failure of man to fully use his masticatory apparatus is conducive to malocclusion and periodontal disease. There has been in the past twenty-five years a marked increase in periodontal disease, but we as dentists have not, I think, recognized the full importance of this problem. We work diligently to repair the effects of caries so that our patients can save their teeth, and for what? For the teeth to be lost as the result of periodontal disease.

Periodontal disease like age creeps upon us slowly, and is often in full maturity before its presence is recognized. The onset of the disease is insidious and its progress slow. The symptoms are often mild and obscure so that its presence is unknown until the disease is advanced. Late diagnosis in periodontal disease, as in tuberculosis, cancer and many other chronic diseases, means a poor prognosis.

Why is it that more teeth are lost as the result of periodontal disease than from any other condition? Is it because we have not made a diagnosis early enough to insure a favorable prognosis and have, as a result of our failures, developed a psychologic and philosophic attitude of hopelessness regarding this disease? Or is it because we lack the necessary criteria to make an early diagnosis? It is, I think, because we have not utilized to the fullest the available information regarding this disease and we have, at the same time, developed an unfavorable and fatalistic attitude toward the disease.

It is, therefore, my desire this afternoon to discuss three forms of periodontal disease; namely, gingivitis, Vincent's infection and pyorrhea, from the etiologic, diagnostic and prognostic points of view and, in a general way, to discuss treatment.

Before we can enter into a discussion of what constitutes gingival and periodontal disease, it seems advisable to review briefly the characteristics of a normal periodontium. The gingival tissues that constitute the periodontium are well festooned around the necks of the teeth. In the interdental area, the tissues completely fill the interproximal space up to the contact point. The free margin of the gingiva is thin, wedge-shaped and adapted closely to the tooth at the cemento-enamel junction or on the cementum. As the individual becomes older, there is a tendency to slight recession of the gingiva, causing the epithelial attachment to move onto the cementum.

The gingiva is pale pink and uniform in color throughout. It becomes redder as it becomes thicker in approaching the floor of the mouth or the mucobuccal fold. The tissues are hard and firm with a stippled surface, which, if dried, gives to the gingiva a velvet-like quality.

We can now compare the normal ap-

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Read at the annual meeting of the Michigan State Dental Society, Detroit, April 18, 1944.

pearance of the gingival tissues with the changed appearance in various forms of periodontal disease. The alterations found in the gingival tissues will serve as criteria for diagnosis. Alteration in color, form, density or attachment is an indication of gingival or periodontal disease.

GINGIVITIS

Inflammation of the gingiva, the most common form of periodontal disease, presents varied manifestations, depending on its etiology.

Simple gingivitis is due to gingival irritation caused by the retention of food débris, the presence of organisms and the deposition of calculus. It is associated with or is produced by a lack of oral hygiene. It is often found in patients having a malarrangement of the teeth in which it becomes difficult to clean the teeth. It is exhibited by persons who are unable to or do not maintain oral hygiene.

The gingival changes are varied, depending on the severity of the disease. The changes are characteristic of inflammation in any tissue. There is intensification of color, the areas most severely affected showing the greatest change. Because the gingivae are not wholly involved, there is a loss of uniform coloration, producing localized areas of increased color intensity, which usually occur at the free gingival margin and in the interdental papillae. Associated with the alteration of color, which is due to the increased flow of blood into the involved area, there is also swelling. The free margin of the gingiva becomes thickened. The interdental papillae become bulbous, and the surfaces lose their stippled character and become shiny. The density of the tissue likewise changes because of fluid accumulation and becomes soft and spongy. These changes are the cardinal signs of inflammation, and thus the characteristic findings in incipient gingivitis. These findings, usually magnified, are typical of simple gingivitis and are the earliest signs of all forms of periodontal disease, of which simple gingivitis is often the precursor.

Simple gingivitis may after an indefinite period become chronic. Chronic gingivitis is characterized by tissue reactions of a reparative and proliferative nature, with hypertrophic gingivitis resulting.

Hypertrophic gingivitis is characterized by an increase in the supporting tissues of the gingiva. This increase in supporting tissues causes the free margin of the gingiva to become markedly thickened and have a rolled appearance. The interdental papillae become large and bulbous. The proliferative change is superimposed on, or combined with the signs of, simple gingivitis. Hypertrophic gingivitis is, in some instances, the direct response by certain persons to chronic irritation of a mild degree; that is, some persons have an inherent tendency to a proliferative reaction.

Another type of hypertrophic gingivitis of a severe nature occurs spontaneously, usually in the young. It is a generalized process involving the entire gingivae. The proliferative activity is so marked that often the teeth are completely covered by gingival tissue. This form of hypertrophic gingivitis is hereditary, the condition being present in several members of a family and even several generations of the same family. The age of the patient, the severity of the condition and the family history are the points of importance in making a differential diagnosis.

Another form of hypertrophic gingivitis is chemically induced. It is the result of dilantin sodium therapy for the treatment of epilepsy. The differential diagnosis is made from the history.

The treatment of hypertrophic gingivitis is dictated by the type exhibited. Simple hypertrophic gingivitis is treated by prophylactic measures and gingival

stimulation. In the hereditary form, treatment is usually unsatisfactory. Surgical measures may often be necessary to remove the excess tissue, but this is only temporary. Simple prophylactic procedures may be of value in retarding the proliferative activity following surgical measures.

Dilantin gingivitis should be treated by prophylactic measures, cessation of dilantin therapy and, in some cases, surgical procedures. The value of vitamin C administered with the dilantin is debatable.

Other forms of gingivitis may be chemically induced, especially by the use of heavy metals such as bismuth, lead and mercury.

Bismuth gingivitis is manifested as a simple gingivitis with marked color alterations. The free margins of the gingivae are deep blue, the color being most intense in the areas most inflamed. Bismuth gingivitis, which is usually the result of antisyphilitic therapy, is treated by prophylactic measures.

The ingestion of lead in various forms produces a similar change in the gingivae. There is a finely stippled area of blue pigmentation at the free gingival margins, the coloration being most intense in the areas showing the poorest home care. The patient will have other signs of lead poisoning, and the history will be characteristic. The history is the most valuable and reliable differential diagnostic criterion.

Mercuric gingivitis and stomatitis are necrotic in type. The gingival tissues become swollen, soft and flabby. There is often ulceration of the type associated with Vincent's infection. The gingivae are tender and bleed freely. There is a foul taste, sometimes metallic. There is usually extreme salivation, which, plus the gingival changes, is characteristic of mercury poisoning.

Hormonal dysfunction, especially ovarian, is another important cause of gingivitis. Hyperfunction during pregnancy causes so-called pregnancy gingivitis, which is hypertrophic; while hypofunction, following either a natural or an artificial menopause, is responsible for chronic atrophic senile gingivitis. There is no doubt that other forms of gingivitis are hormonal, but our knowledge of the changes is insufficient to warrant a definite statement regarding the hormonal relationship.

Gingivitis is also frequently traumatic, the result of food impaction, local trauma or, especially, traumatic occlusion. Traumatic gingivitis, which is usually proliferative, frequently results in severe destruction of the periodontium.

VINCENT'S INFECTION

There is much discussion as to the etiology and communicability of Vincent's infection, fusospirochetosis, or ulceromembranous stomatitis.

It is well established that the fusiform bacillus and Vincent's spirochete play some part in the etiology of this disease. However, the extent to which they are responsible is debatable.

Belding and Belding[1] state that these organisms are the initial invaders and are entirely responsible for the disease.

Kretschevsky[2] represents a group who do not think that they are the initial invaders, but believe that they are the causative organisms and that the severity of the disease is directly proportional to the number of organisms present.

Pilot[3] represents a large group who think that the organisms are normal inhabitants of the mouth and that an alteration in the symbiotic relationship causes an increase in the number of organisms and, simultaneously, spreads the disease. He also states that healing takes place in proportion to the decrease in the number of organisms.

Let us consider for a moment some of the facts known about Vincent's infection.

First, by bacteriologic examination, it has been found that more than 90 per

cent of the adult population have Vincent's organisms in the mouth continuously.

Second, it has been shown that when the typical signs of Vincent's infection are present, the number of Vincent's organisms increases greatly, while other types of oral flora decrease or disappear completely.

Third, it has been shown that, as the infection is treated and as the signs and symptoms disappear, there is a decrease in the number of Vincent's organisms and a proportionate increase in other components of the mouth flora.

Fourth, we also know that the lesions of Vincent's infection are frequently associated with a lack of oral hygiene and with areas of local irritation.

Fifth, systemic conditions such as mercury poisoning, pellagra and leukemia, which result in a lowered gingival resistance, frequently have an associated Vincent's infection.

I add to these known facts, the following observations:

1. Vincent's infection is frequently associated with upper respiratory infections.
2. At the university dental clinic, we always have an increase in the incidence of Vincent's infection during examination periods, and this is correlated with an increase in the cases of upper respiratory disease seen at the health service during the same period. This suggests that the disease is associated with lowered body resistance, as is the common cold.
3. Another observation, perhaps not so convincing, but nevertheless suggestive, is that, in the dental clinic, among the student population, most of the new cases of Vincent's infection are seen at the clinic on Tuesday or Wednesday. This suggests again that lowered resistance due to loss of sleep or the excessive use of tobacco and alcohol over the week-end results in lowered resistance and plays a part in the production of Vincent's infection.

In summarizing the etiology of Vincent's infection, we may say that, because of lowered local and general resistance, the symbiotic relationship of the oral flora is altered in such a manner that the Vincent's organisms increase in number to the exclusion of all others, and that the action of this greatly increased number of organisms on a gingiva low in vitality is responsible for the disease.

If we accept these facts and observations, the disease must be regarded as caused by organisms normally present in the mouth, and, in the presence of lowered gingival resistance, these organisms find an environment favorable to rapid growth, excluding all other flora, and pure cultures of these organisms then have the ability to produce the disease in devitalized tissues.

The only logical conclusion as to the communicability of Vincent's infection must be that a disease produced by organisms normally present in the mouth, which are effective only in the presence of lowered gingival vitality, cannot be a communicable disease. This is contrary to previous teaching, but is very important in formulating treatment.

The diagnosis of Vincent's infection is based on the characteristic history and a few important signs observed in the mouth.

In the acute phase of the disease, the patient complains of bleeding of the gums, tenderness and pain, a foul taste and general lassitude. On examination, the gingivae are tender, red and swollen. They bleed freely when touched. There are ulcerations covered by a grayish white pseudomembrane present on the free margin and in the interdental space. On removal of the necrotic interdental papillae, a saucer-shaped lesion is found. The saucerlike area of destruction of

the interdental papillae is pathognomonic of Vincent's infection.

In the subacute form of the disease, the acute symptoms are lacking, ulceration is confined to the interdental papillae and the gingival tissues show the changes of a mild chronic gingivitis. Bleeding is persistent.

In the chronic phase of Vincent's infection, the only persistent symptom is bleeding. The destruction is more advanced and is limited for the most part to the interproximal area. The gingival changes are those of a severe chronic gingivitis. There is usually an excessive deposition of black, hard subgingival and extragingival calculus. The degree of destruction depends on the duration of the disease. Frequently, pocket formation results.

The acute form of the disease must be differentiated from herpetic stomatitis, leukemia, vitamin deficiency and mercury poisoning, all of which cause lowering of vitality and present a picture similar to that of acute Vincent's infection.

The prognosis of Vincent's infection is good if the condition is adequately treated in the acute stage. In the subacute and chronic forms of the disease, in which there is much tissue destruction, the disease process can be eliminated, but complete regeneration is often difficult.

The third form of periodontal disease to be discussed is pyorrhea, or periodontoclasia. This disease is characterized by changes indicative of gingivitis, the movement of the epithelial attachment in an apical direction, detachment of the fibers of the periodontal membrane and resorption of alveolar bone. The result of these processes is pocket formation, which is distinctive of periodontoclasia.

All disturbances in the periodontium should be considered not as a single disease, but as a syndrome or complex process involving a single tissue. A combination of conditions that both lowers the tissue resistance and acts upon these weakened tissues is necessary to establish the disease. The significance of lowered vitality is clearly shown by the fact that this disease is closely associated with advancing age. It is for this reason that a search for a single etiologic factor and a specific treatment has met with failure.

The complex multiple factors in this disease are in part local and in part systemic, with a strong relationship between the existing factors. The local etiologic factors, which make up the larger group, are:

1. Irritational conditions:
   (a) A lack of oral hygiene results in gingivitis and calculus formation. The deposition of calculus in the gingival crevice causes chronic irritation and ulceration of the lining of the gingival crevice. The loss of protective epithelium permits the organisms present to enter the underlying periodontal membrane, causing inflammation and destruction of the periodontal fibers. As a result of this destruction, stimulation to the alveolar bone is diminished, and it undergoes resorption. As the periodontal fibers are detached, the epithelium of the crevice proliferates along the surface of the root, typical pocket formation resulting.
   (b) Food impaction is caused by open contacts, difference in height of the marginal ridges of adjacent teeth, poor tooth form, malposition and crowding of the teeth. These conditions all result in a continuous impingement of food, producing chronic irritation.
   (c) Mechanical irritation may be due to the presence of overhanging margins of fillings, inlays and

crowns; orthodontic appliances, and partial dentures that impinge on the tissue. Improper tooth-brushing habits may be included in this group.

(d) Local chemical irritation may result from taking certain substances into the mouth.

(e) Mouth breathing, because of drying, causes the gingival tissues to undergo change and to be more susceptible to the organism in the oral cavity.

2. Functional disturbances, the effect of which, either singly or in combination with other factors, cannot be overemphasized as an etiologic factor in the production of periodontal disease.

Hyperfunction is produced by a too powerful musculature, bruxism and improper placing and design of bridges or partial dentures, which transmit an excessive functional load to the abutment teeth. Loss of teeth, especially the posterior, results in closure of the bite and, consequently, excessive pressure on the anterior teeth.

Hypofunction, of equal importance, is caused by non-occlusion, indolent mastication and unilateral mastication.

3. Systemic factors, which are obscure and not nearly so well understood. These are difficult to differentiate even when suspected. Those systemic factors most definitely correlated with the syndrome are metal poisons, endocrine dysfunction and debilitating diseases.

Let me repeat that it is not a single condition acting individually, but a combination of conditions acting in unison upon a single structure, the periodontium, which is responsible for this disease.

The diagnosis of pyorrhea presents no problem. We need only explore the gingival crevice to determine the depth of pocket formation, and study roentgenograms to observe the loss of bone. The severity of the disease is indicated by the depth of the pocket and the associated bone resorption.

Outline of treatment and prognosis present the greatest problem in the management of periodontal disease. Before treatment can be outlined, it is necessary to determine the cause. When the cause has been ascertained, the treatment can be planned. It consists of removing all sources of local irritation. This includes scaling and subgingival curettage, general operative procedures to restore contact and contour, the replacement of missing teeth, elimination of the periodontal pocket and adjustment of the occlusion. It also embodies elimination of systemic factors if possible and the establishment of maximum general resistance. Only by employing complete and thorough measures embracing all phases of dentistry can we expect to obtain the desired results.

The prognosis of any case of periodontal disease depends on how keenly we observe and distinguish the etiologic factors and whether we eliminate those factors. This, plus a good state of general health and resistance, determines the success of the treatment.

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WAR PROBLEMS OF DENTISTRY: THE SOUTH IN THE CIVIL WAR

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WE ARE in the midst of a global war, a war so vast and far reaching in its repercussions that for no one of us is life exactly as it was before. For those members of the profession who are in the armed forces, there has occurred a sudden and dramatic change; for those remaining at home, the transformation has been more gradual and less perceptible. The civilian dentist today can no longer get what he wants when he wants it. In spite of this fact, dental supply houses are still open and dental laboratories are still operating.

There was, however, in the history of our country, a war period in which conditions were not so favorable, when the very existence of a section of the profession was threatened by the elimination of those adjuncts which we, even in war today, take for granted.

In 1860, there were, roughly, 5,000 dentists, one-fifth of whom were located in the Southern states[1]; but although, in that year, the students of the South comprised the majority of the graduating classes of the two eastern dental schools then in existence,[2] the dentists of the South were almost entirely dependent on the North for their materials, as well as their contacts with organized dentistry.

The South had no dental school or publication of its own. Its only dental society, in Georgia, had been founded the previous year with eleven members. (The Virginia Dental Society had met last in 1846.[3]) The firm of Brown and Hape, of Atlanta, was the sole establishment in the South engaged in the manufacture of gold foil and dental materials. Under its auspices, there appeared, in May 1860, the first issue of *The Southern Dental Examiner,* edited by Dr. J. P. H. Brown, of Brown and Hape. The corresponding editor was Dr. George S. Fouke, of Westminster, Md. The editors stated that "the dentists of the South do need a medium through which they can express an interchange of views to their mutual benefit."

It seems that there was a poor response to the request for original communications, since, aside from the ones written by the editors themselves, they appeared but rarely. Each issue consisted of thirty-six pages of written matter and contained besides the advertisements of Brown and Hape of their own teeth and foil, advertisements of equipment of northern manufacturers.

However, neither the firm nor its magazine was destined to sail a smooth course. Toward the close of the year, Lincoln was elected President, and South Carolina seceded from the Union. By the spring of the following year, the Confederacy had been formed, Fort Sumter had been fired on, and the Civil War was on.

Hardly three months had elapsed since the beginning of the war before the publishers ran into difficulties. In July 1861, there appeared the following:

> A word with our subscribers.—Owing to the fact that a great many of our subscribers are now in the army, and as the abolitionists have cut off all communication with our corresponding editor, we have concluded

to issue the *Examiner* only every other month, at least during the continuance of this unrighteous war. We shall give our subscribers the same amount of reading matter for their money as we did before.

Although we are represented in the army, we have not suspended, nor have we any intention of doing so, but shall continue to supply the profession with gold foil, teeth and materials just as low as they can be sold. Brown and Hape.[4]

A month after Fort Sumter was fired on, dentistry had been drawn into the whirlpool of inflation, for a special notice, printed in May 1861, read:

Gold is now *ten percent premium* in Atlanta, and we are very reluctantly compelled to ask our patrons to remit us gold or silver in payment for *Gold Foil and Gold Plate.* When this is not sent us, we will be under the necessity of deducting ten per cent on paper money. This has reference to *Foil and Plate only.* For all other goods the bills on all solvent Banks in Georgia, South Carolina, Tennessee and Louisiana, will be taken at par. As soon as the premium on gold is removed, we will take in payment, at par, the above named bills for Foil and Plate. Brown and Hape.[5]

This was just the mere beginning, for, by the end of 1864, the price demanded for gold foil was $64 per ounce in gold coin, a rise of over 130 per cent in gold. This amount in Confederate money amounted to $3,840, for the prevailing price of gold was 60 to 1. We can obtain a fairly good picture of these turbulent times and glean some understanding of what inflation really means through the memoirs of a dentist practicing at the time. Referring to this period, W. Leigh Burton wrote:

Having to pay so enormously for materials—the value being enhanced from the fact of their having to run the blockade—the charges of dentists were proportionally high. The charge for a gold filling was $120.00, for extracting a tooth $20.00 and for an upper set of teeth on gold or vulcanite base, from $1800.00 to $4000.00. Let it not be understood that high prices were confined to dentistry alone. It was no uncommon thing to pay $1800.00 for a coat, $300.00 for shoes, $1000.00 for cavalry boots, and from $300.00 to $500.00 for an ordinary felt hat. A man considered himself lucky in being able to purchase a turkey for $300.00, which was indeed above the gold standard, but Confederate money was plentiful and turkeys were scarce, and the scarcity became greater in proportion to the frequency of the raids of Federal commanders, so that before the close of the war it was with difficulty that fowls could be obtained for love or money.[6]

Before the end of the year, the *Southern Dental Examiner* was approaching dangerous reefs. In the January issue of 1862, there appeared the following announcement:

The issue of this number of the *Examiner* has been unavoidably delayed, in consequence of being unable to obtain suitable paper upon which to print it.

After this issue, the *Examiner* never appeared again; but the difficulties for the firm of Brown and Hape and the profession which they served did not terminate with the demise of the *Examiner.* A really critical manpower shortage developed in the Confederacy, since its entire population was only 9,000,000, one-third of whom were slaves. Consequently, the Bureau of Conscription became very strict in considering exemptions from military service. A little less than a year after Brown and Hape had assured the profession that they would not suspend operations, the passage of the Conscription Bill threatened all of their employes with immediate induction into the Army. Faced with this threat, the proprietors, May 6, 1862, sent the following letter to the Secretary of War at Richmond, Va:

Dear Sir,—

Since the passage of the Conscription Bill we have been urged by the most prominent Dental Practitioners in the Confederacy to allow the enclosed Petition to be presented you for exemption from military duty of such workmen in our Factory of Gold foil and

teeth as are necessary to conduct the business.

We beg leave to inform you that our manufactory of Gold Foil and Dental Material is *the only one* of the kind in the whole Confederacy, so in case we have to stop the Dentists of our country will also have to stop practice, and let their patients' teeth rot and decay.

In the present state of our country, *manufacturing Dental Material* is *not a common business*. Workmen in this branch are very scarce and can only be procured with the greatest difficulty. We have been manufacturing Dental Material over one year, and have gone to great expense in procuring competent workmen and complete fixtures to conduct the business.

We have positive knowledge that *our* Gold Beater's tools are the only *complete* set in the Confederacy. They can *only* be obtained by importing them from Europe.

We have reduced our hands down to the fewest possible number to conduct the Factory, and *each* party named in the petition for exemption, performs a labor which *no others* can perform at present; for, in the present state of affairs *no other workmen* could be obtained to supply their place.

Resting under the conviction that, by serving with material a Profession that administers to the health and comfort of the people of the Confederacy, we are doing good, and aiding in achieving the independence of our country we most respectfully submit for your consideration the Petition, together with a letter from our immediate Representative in Congress, the Hon. L. J. Gartrell, and also a number of letters from some of the most eminent Dentists in the Confederacy.

We beg leave to state that the signatures *pasted* upon the petition were enclosed to us for that purpose.

In view of the foregoing we pray that the petition may be granted, exempting us and the two operatives named in the petition from military duty.

It is a matter of vital importance to us that you act upon it as early as possible.

Very respectfully

Your ob'nt Servants

Brown and Hape.

The petition referred to, also dated May 6, 1862, reads as follows:

To the Hon. Sec'y of War, Richmond, Va.

We the undersigned Dentists of the Confederate States of America, do respectfully represent, that the Factory of *Gold Foil* and *Dental Material* of Messrs. Brown & Hape of Atlanta, Georgia, is the *only* Factory of its kind in the Confederacy; and that if the said *Factory* be stopped, we cannot procure material to conduct our business, and must necessarily let the teeth of our patients go on to decay and destruction.

On the score of humanity to our patients, and as a duty to ourselves, we do, therefore, humbly and urgently petition you to exempt from military duty such workmen as are necessary in carrying on the above named Factory.

As an explanation for the small number of names here appended, we would state that the profession are so scattered over all portions of the Confederacy that months would elapse before their signatures could be obtained to a petition for the above purpose, and we have only addressed ourselves to those dentists in the principal Cities where mail facilities would enable us to hear from them at once.

We, therefore, pray the Hon. Secretary of War to grant the necessary order exempting J. P. H. Brown and Samuel Hape from military service, and also Oscar H. Blaisdell, operative and *gold beater*, and J. B. Bean, *tooth maker*,—all connected with said manufactury of Gold Foil and Dental Material. We presume the words *"and other factories"* mentioned in the act of exemptions refers to cases of this kind. And your petitioners will ever pray.

Henry Huntington, M.D., D.D.S., Atlanta, Georgia.
W. H. Gates, D.D.S., Atlanta, Georgia.
J. B. Murphy, Atlanta, Georgia.
E. Parsons, D.D.S., Savannah, Georgia.
E. W. Robins, D.D.S., Savannah, Georgia.
E. Henry, Savannah, Georgia.
C. Henry, D.D.S., Savannah, Georgia.

The undersigned, practitioners of the profession of Dentistry at Columbia, So. Ca. heartily concur in the prayer of the above Petition; less in regard to the necessities of the Profession than to the fostering of an

art which we well believe entitles it to great consideration from the Government.

Signed—

Reynolds & Reynolds
Decatur P. Gregg
I. D. Durham
Doctor Geo. Phelps, Columbus, Geo.
Jacob Fogle, Columbus, Geo.
C. T. Cushman, Columbus, Geo.
Theo. S. Hoyt, Columbus, Geo.

We the undersigned Practitioners of Dentistry cheerfully give our names for the purpose of securing, if possible the manufactory of gold foil and artificial teeth, so necessary to relieve suffering and thereby to secure health.

B. A. Rodrigues, M.D., Surgeon Dentist, Charleston.
W. A. Brown, D.D.S., Surgeon Dentist, Charleston.
B. A. Muckenfuss, Surgeon Dentist, Charleston.

Augusta Ga., April 29th, 1862.

Drs. Brown & Hape

Gentlemen

I most cheerfully consent to the use of my name in your petition to the Sec'y of War to include the operatives in your Foil manufactury in the exemptions for conscription and earnestly hope it will be granted.

Very respectfully

Charles M. Wright.

We fully concur with Dr. Wright

Wm. H. Burns.
W. E. Spears.
E. M. Allen, Marietta, Ga.
F. D. Thurman, D.D.S., Atlanta, Ga.
G. W. Emerson, D.D.S., Macon, Ga.
G. McDonald, Macon, Ga.

In order to strengthen the appeal of this petition, the Congressman from Georgia wrote the following letter:

Dear Sir,

I trust you will pardon me for asking your especial consideration of the accompanying petition and papers. Messrs. Brown and Hape are citizens of this place, known to me to be true to our great cause. They have as stated in their letter & petition incurred great expense in order to enable them to manufacture Gold Foil & Dental Material.

To make us in this business independent of the North this enterprise ought to be encouraged. The importance of such a manufactory is evident. These gentlemen together with their *Beater* and Tooth Maker are all operatives and their services indispensable to the prosecution of the business. The act of exemption leaves it in your discretion to exempt "superintendents and operatives in wool *and other factories.*" Their *factory* is an important and *the only one* of *the kind* in *the Confederate States.* Under these circumstances I take pleasure as their immediate Representative in endorsing the enterprise of these worthy and energetic men and requesting you if deemed consistent with the public service to send an order exempting Messrs. Brown & Hape and their two workmen above named from military service. I suppose this will be the only application of the kind in the Confederate States as there is no similar factory within our country. With sentiments of highest esteem, I am,

Very Respectfully
Your Obt. Servt.,
Lucius J. Gartrell,
Repr. from Geo.

Hon. G. W. Randolph,
Sec'y of War,
Richmond, Va.[5]

The dental profession in the South was not unified or even organized. The geographical difficulties involved in organization have already been mentioned in the foregoing petition; but, in addition, there were personal obstacles. An example is the attitude of a Macon dentist toward the Georgia Dental Society, which was formed in June 1859 at Macon. In the first issue of the *Southern Dental Examiner,* in May 1860, G. McDonald, who later signed the petition, objected to the fact that definite action had been taken at the preliminary meeting with only eleven dentists present, who were about equally divided in their views as to whether a society was to be formed at that meeting. He proposed that all form of proceedings be wiped out and that a new start be made at the coming meeting in June 1860 at Savannah. These individual differences rapidly disappeared, however, when the very existence of the dental profession was threatened. A common danger compelled dentists to join in a common cause.

The concern that the profession felt in this situation is expressed in the following letters to Brown & Hape.[7] G. W. Emerson, one of the founders of the Georgia Dental Society, and its second vice-president, emphasized the importance of making some provision for assuring dental care for the civilian population. He wrote:

Macon, Geo., April 29th, 1862.

Messrs. Brown & Hape:

Gents: Yours of 28 is to hand. I cheerfully tender the use of my name for the purpose of assisting in procuring exemption of dental manufactories and others needed in communities. It is absolutely necessary that foil and other material should be manufactured and also that every town of importance have at least one *competent* dentist remain to attend to the teeth, otherwise great suffering will occur. I hope you will act promptly in the matter. I cannot give you the names of any dentists except those you have been furnishing material. Wishing you success, I remain,

Truly yours,

G. W. Emerson.

Please let me hear of your success.

E. M. Allen, the first vice-president of the same society, stressed the importance of dental care for soldiers. His letter reads:

Marietta, Georgia,
May 6th, 1862.

Messrs. Brown & Hape,
Atlanta, Georgia.

Gentm.:

I do sincerely hope that you may be placed among those who are exempt from military service, as you are the only parties who manufacture Gold Foil in our Southern Confederacy, and without it thousands of soldiers and their families must suffer for the want of proper attention to their teeth. Not a week passes that I do not have to plug teeth for *Soldiers* thereby saving an immense amount of suffering when they are in service. If you have to close up your business thousands of them and their families must suffer.

Hoping government will look favorably upon the matter I remain,

Yours truly,

E. M. Allen,
Dentist.

C. T. Cushman stressed the military effects of dental neglect:

May 1st, 1862.

Messrs. Brown & Hape,
Atlanta, Ga.

I join in the petition to exempt Foil makers from Military Service, on the ground of public necessity. It would be governmental policy to exempt them, for the sake of Soldiers alone. Thousands of them would be unfitted for duty by neglecting to have their decayed teeth filled before going into camp. I know an officer, lately furloughed, necessarily, for this cause alone. Almost every prudent man accustomed to guard his health has wisely employed a dentist before going into our Army, where unusual exposure makes him liable to unusual suffering and disability.

C. T. Cushman,
Columbus, Ga.

Elisha Parsons, corresponding secretary of the Georgia Dental Society, provided a suggestion in the event the appeal should be denied:

Savannah, April 30th, '61.

Messrs. Brown & Hape.

Gentlemen:

Yours of the 28th is recd. It would be a great calamity to the Profession and the Public and I hope you will succeed in obtaining an exemption for your Gold Beater. If your plan should fail there is one chance left, that is to have him detailed for special business. This can be done by the Commander of the Division he is enroled in.

I am nearly out of foil. I want one oz. of No. 4 and 1 oz. of No. 6. I have the gold to pay for it. Please send by express, as usual. If this does not suit you please let me know on rec't of this.

Yours truly

Dr. E. Parsons.[7]

According to W. Leigh Burton, who was alive during this time, the enterprise and singleness of purpose of the pro-

fession was finally rewarded. Referring to the situation, he wrote:

> At the commencement of, and during the war, there was only one firm in the South engaged in the manufacture of gold foil and dentists' materials—Messrs. Brown and Hape of Atlanta, Ga. Owing to the rigid conscription laws passed by Congress, the principals and employees of this establishment were conscribed at an early period, and consequently its operations ceased; until through the intercession of the surgeon general and the entire dental profession, they were exempted from military services. They had scarcely resumed operations, however, when they were forced to remove to Augusta by the evacuation of Atlanta, by the Confederate Forces. But misfortune seemed to cling to these enterprising gentlemen. One of the firm having received a permit to purchase machinery and materials for the manufacture of gold foil, abroad, was about entering a Southern port, when the ship was wrecked and everything on board went to the bottom of the sea.[8]

However, it cannot be said that the dental profession went down either with the firm of Brown and Hape or the Confederate cause. The formation of the Southern Dental Association shortly after the war was undoubtedly aided by the understanding of the necessity for joint action on the part of the profession during the war. The confidence of the profession in itself was bolstered by the recognition of dentistry in the Confederate Army through the efforts of individual practitioners of the time. The achievements in the treatment of fractures of the jaws, later in the war, by James Baxter Bean, the toothmaker in the above-quoted petition, won wide acclaim both in this country and abroad. However, these interesting episodes in the history of the profession deserve separate treatment. For the present, it is interesting to note that it was F. Y. Clarke, the Georgia Dental Society's second president, who was the first to present to the national dental bodies resolutions asking for the appointment of dentists in the Army and the Navy.[9]

A knowledge of the war problems as well as the war activities of American dentists of another era is not merely interesting, but also serves a more important purpose. It can help to broaden our perspective and increase our objectivity. This should indeed enable us to evaluate our own sacrifices today.

Charles A. Beard, foremost modern historian, speaking of the value of history says: "A sense of history in a people is, in my opinion, necessary for continuity in institutional life and for adaptation to changes bound to come."

There can be no doubt that modern cvilization is changing in all its aspects. In this turbulent period, if American dentistry is to safeguard its achievements, it must possess a "sense of history."

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2 East Fifty-Fourth Street.

A BRIEF HISTORY OF ROOT-CANAL THERAPY IN THE UNITED STATES

L. Pierce Anthony, D.D.S., Chicago, Ill., and Louis I. Grossman, D.D.S., Dr. med. dent., Philadelphia, Pa.

DESPITE the celebration of the centenary of dentistry in 1940, dentistry is as old as the hill upon which ancient man placed his victim to knock out an aching tooth with tool of flint or stone. By comparison, root-canal therapy is recent; in fact, modern.

Root-canal therapy as we know it today was non-existent a hundred years ago. When the pulp died, a cavity was prepared to allow drainage. When the symptoms subsided, the canal was filled. In some cases, the canal was allowed to remain open permanently for egress of "mephitic exhalation." If a fistula occurred, it was considered good practice to stuff a few fibers of cotton into the mouth of the "gum boil," to act as a wick for removing the "foul elements." Any tooth capable of functioning and not giving actual pain was considered a serviceable tooth unrelated to general health. While the filling of cavities took up most of the dentist's time, up to about 1890 abscessed teeth took up most of his thought, so commonly did pulps die after the insertion of fillings.

The earliest recorded effort toward treatment of the diseased pulp in this country was that of Robert Woofendale, who first came to New York from England, in 1766, and brought with him a method of procedure for handling diseased teeth which was directed solely to the alleviation of pain through destruction of the tooth pulp by actual cautery. No attempt was made to fill the canals, however, unless stuffing the open canals with cotton could be designated as such.

An effort to fill the canal with an impervious material was first made in this country by Edward Hudson, who practiced in Philadelphia. He designed special pluggers and filled the root canals with gold foil. A bill rendered by Hudson to a patient for services from November 1824 to April 1825 included a ten-dollar charge for "stuffing the cavity of one tooth from the end of its roots with gold." Note that the emphasis is placed on filling the canal. Treatment of the canal is not even mentioned, since it did not exist.

PULP CAPPING

Until about 1820, little or no attempt was made to save the pulp if injured. It was destroyed either by cautery or by acid. Shortly before that time, Leonard Koecker, who practiced in Philadelphia from 1812 to 1822, not only advocated pulp capping, but also gave much currency to the procedure by his publications on the subject. He was of the opinion that the exposed pulp had to be seared first, and so he used the following technic (we shall let him describe it in his own words):

I require for the operation the following apparatus: 1. A thin iron wire, fastened to an ivory handle. 2. A tallow candle, with a thick wick. I put the candle into his (the patient's) left hand, and direct him to hold

Read at the first annual meeting of the American Association of Endodontists, Chicago, Ill., February 25, 1944.

From the School of Dentistry, University of Pennsylvania.

it so that the flame of it may be in a position horizontal with his mouth, and about 8 inches from it.

Koecker then dried the cavity and heated the wire "red-hot" in the flame of the candle.

With the wire thus heated, I touch the denuded part very rapidly, so that its surface cicatrizes; without however suffering it to penetrate deeply into the substance of the bone or the cavity; for this would inevitably bring on suppuration and destruction of the nerve. . . . I now take a small plate of very thin lead leaf, and lay it upon the denuded nerve and immediately surrounding bony parts. I next fill up the whole cavity, very carefully, with gold.

Such was the treatment for an exposed pulp a little more than a hundred years ago.

Until 1830, efforts were confined chiefly to treating the exposed pulp, while attempts to remove the pulp and fill the canals were made by relatively few dentists. When exposed, the pulp was covered with a layer of goose quill, parchment, paper, lead or gold leaf, asbestos or other indifferent substance. Later on, a medicament was first applied to the pulp with or without a pledget of cotton and this in turn was covered over with one of the pulp capping materials already mentioned or with others, such as horn and rubber. The medicaments used were an essential oil, creosote, phenol or even cologne. In 1876, N. C. Keep, of Boston, introduced oxychloride of zinc cement. This cement was used for pulp capping for many years.

About 1830, the prevailing physiology taught that the external periosteum (periodontal membrane) nourished the root of the tooth, while the internal periosteum (pulp) nourished the crown of the tooth. It was thought that, when the internal periosteum died, the crown died with it and had to be removed. Crowns of teeth were therefore excised after death of the pulp, and special forceps were designed for snipping off the crown with a single closure of the forceps. The root, still nourished by the external periosteum, was left in place, with what effect we leave you to judge.

S. P. Hullihen, of Wheeling, W. Va., in 1851 described an operation to deplete a congested pulp, a method which he claimed to have used for about six years with much success. This operation consisted in drilling through the gum and the labial alveolar plate and into the pulp chamber to induce hemorrhage of the pulp. The operation was called rhizodontrypy.

INSTRUMENTS AND APPARATUS

Until about 1875, dental depots did not supply many of the instruments used in root-canal therapy, since, for the most part, they were in the process of being developed. They were sometimes manufactured to the dentist's specifications, but, as often as not, the dentist made his own instruments. Some dentists had regular machine shops where they made root-canal and other instruments needed for practice.

In 1838, that great inventor and dentist Edwin Maynard, of Washington, D. C., filed a watchspring to even greater fineness and used it as a root canal broach. This marked the beginning of the treatment of pulp canals of posterior teeth, since it enabled dentists to enter even the fine canals of premolar and molar teeth. He also prepared a hoelike excavator with the cutting edge at an acute angle to the shaft for enlarging root canals. It cut the surface of the canal when drawn against the canal wall.

In 1852, Robert Arthur, of Baltimore, described the making of barbed broaches for removing pulp tissue from root canals. He states that, after preparing tempered steel broaches of various fine diameters and mounting them in handles:

There should now be cut upon them with a sharp knife, small beards, looking toward the handle of the instrument. Care must be observed, too, that the points of these little instruments should be sharp, so that they will pass alongside of the pulp in the fang, and not push it upward in the attempt to take it away.

In 1862, S. C. Barnum, of New York, gave rubber dam to the dental profession without exacting a royalty, at a time when many patents were being exploited at the expense of the dental profession. This made aseptic root-canal treatment more practicable.

In 1886, George Evans, of New York, described an instrument for drying root canals, which came to bear his name. The object of the instrument was disinfection of the canal by means of heat as well as drying the canal preparatory to filling it.

This method of root-canal preparation apparently became popular since, two years later, H. C. Register, of Philadelphia, described a method of drying root canals with compressed air heated to 130°F.

In 1891, J. S. Marshall, of Chicago, advocated and helped to popularize the use of the electric pulp-tester for determining whether the pulp was vital.

PULP EXTIRPATION

Extirpation of the vital pulp was seldom attempted because of the attendant pain. The first attempt at painless removal of the pulp dates back to about 1836. Until then, when the pulp became painful and had to be removed, it was burned into oblivion with a red-hot iron or eaten away by the use of a corrosive acid such as sulfuric or nitric. Then Shearjashub Spooner, of New York, at the suggestion of his brother, a chemist, used arsenic for destroying the pulp before removing it. We quote from his book:

> The nerves of teeth may be certainly and effectually destroyed, with little or no pain to the patient and without the least danger, by means of a little arsenious acid (arsenic, ratsbane) applied to the nerve.

While accepted and used by some, arsenic was condemned by others. H. Burdell, of New York, stated two years later:

> I will here mention the very dangerous treatment resorted to by a few New York dentists, which consists in applying arsenic, or rat's bane, to the excited nerve. Notwithstanding this most atrocious practice, a dentist of this city in a late publication of his, recommends this *remedy*, (the most deadly and corrosive poison) to be applied to the teeth. It was supposed, when the Crawcours left this country, that *valuable* discoveries of this kind were at an end. . . . A case in which this vile and dangerous substance was applied recently came under my care. The patient was a lady; the arsenic was applied by a dentist to the bare nerve of one of her double teeth, and in a few days after her face became much swollen, accompanied with the most violent forms of *neuralgia facialis*.

While it is true that arsenic destroyed the pulp painlessly in many cases, it also destroyed the adjacent tissues through leakage of the arsenic from the cavity, owing to the fact that gutta-percha was not yet in use and cements were not altogether impervious.

Because of the difficulties encountered in the filling of canals after removal of the pulp, a method was introduced in this country, about 1866, by Chase, of Iowa City, which was supposed and intended to obviate the filling of root canals. In fact, the nineties may be considered the period in which effort and attention were largely devoted to treatment of the pulp in some such manner as would obviate the removal of the pulp from the canal and consequently the filling thereof. Several efforts have been made since that time to popularize the method, but the potentialities for subsequent infection have prevented its general adoption in this country.

In 1883, G. A. Mills, of Brooklyn, de-

scribed the removal of the pulp by quickly forcing a slender wooden peg into the canal of the tooth by a sharp blow from a mallet. The method was not original with him since it had been used for about twenty years before he described it. When dexterously employed, this method of knocking out a pulp was painless, but, in some hands, it knocked out the patient as well. In 1895, wood points for immediate pulp extirpation were put on the market by B. Q. Stevens, of Hannibal, Mo. They were about 2 inches long, tapered to a point and made of boxwood.

In 1890, E. C. Briggs, of Boston, injected cocaine into the pulp by fitting a blunt needle into a small cavity made in the dentin over the pulp. In the same year, Funk attained anesthesia of the pulp by means of pressure on a piece of unvulcanized rubber, forcing the cocaine solution into the body of the pulp. It might be mentioned that, about this time or a little later, pulps were also removed, supposedly painlessly, after application of electric current from a galvanic battery apparatus.

In 1904, C. G. Myers, of Cleveland, introduced a high pressure syringe for anesthetizing the pulp, called the Myers dental obtunder. A small tapering cavity was first prepared in the tooth by means of a special drill. Into this cavity, a hypodermic needle that fitted tightly was inserted. Pressure was then applied by means of considerable leverage exerted on the syringe plunger, and the cocaine solution was forced into the pulp. The syringe was so constructed that tremendous pressure could be exerted for ejection of the solution and, if the fit of the needle in the cavity was tight, excellent anesthesia resulted.

A year after novocain was introduced, 1906, H. S. Vaughan, of New York, used infiltration anesthesia for anesthetizing the pulp prior to its removal. This was the beginning of a painless era in root-canal therapy as well as for dentistry in general. Partial pulpectomy, i.e., removal of all but the apical third of the pulp, was first advocated by W. C. Davis, of Lincoln, Nebr., in 1920.

MEDICAMENTS

The medicaments used for treatment of toothache in early American dental history were many and varied. Lint that had been dampened with oil of cinnamon, clove, camphor or turpentine was often placed in the cavity of a tooth to relieve toothache. In 1829, S. S. Fitch, of Philadelphia, gave several formulas for toothache pills containing chiefly opium, camphor, oil of clove and oil of cassia. Laudanum and spirit, or even spirit or brandy, was a "home remedy" often applied by the dentist on a piece of cotton to ease an aching tooth. Where a gumboil was present, a poultice of toasted figs boiled in milk applied, while still hot, to the gum over the aching tooth was often recommended.

Arsenic, which, as mentioned, was introduced by S. Spooner, of New York, in 1836 for destroying the pulp, was later used for other purposes as well. Some dentists applied it superficially for relief of pain, or deeper in the cavity for partial destruction of the pulp. It was thought by some that if arsenic were applied to an inflamed pulp for only twenty-four hours, it would affect only the diseased portion, and that if this part of the pulp were removed, the remaining pulp tissue would recover and remain healthy. For example, W. W. Allport, of Chicago, stated, in 1882: "I have also found that, in some cases, by applying arsenic, a portion of the pulp would slough off and the balance of the pulp would take on a healthy action and live for years." Whether the pulp was completely or only partially destroyed, it was removed by some and left *in situ* by others. At times, metallic fillings were placed directly over an application of arsenic in a cavity.

About 1890, interest in root-canal ther-

apy took a definite surge upward. At about this time, creosote (called oil of smoke) perfumed every dental office. To this fragrance that of iodoform was later added.

A. W. Harlan, of Chicago, in 1900 advocated the use of a solution of papain for digestion of dead pulp tissue in the root canal. About this time, pyrozone, a concentrated solution of hydrogen peroxide, became popular for sterilizing root canals. E. Schreier, of Vienna, introduced sodium potassium alloy at the World's Columbian Dental exposition in Chicago in 1893.

Sodium dioxide was introduced by E. C. Kirk, of Philadelphia, in 1892, for cleansing root canals by disorganizing pulp remnants, and for bleaching discolored pulpless teeth.

In 1894, J. R. Callahan, of Cincinnati, suggested 40 per cent sulfuric acid for widening root canals. His explanation of the action of the acid was as follows:

> The solution softens the dentine for an indefinitely short distance; the broach removes this softened dentine, the acid instantly attacks the fresh surface, the instrument again cutting the softened surface, and so on, as long as the tooth is exposed to the action of the instrument and the acid.

Callahan used sulfuric acid not only for opening root canals, but for cleansing and sterilizing as well, claiming that the acid dissolved pulp remnants and helped to sterilize the root canal.

Toward the close of the last century, M. L. Rhein, of New York, empirically advocated the use of an electric current in conjunction with a medicament for treating root canals. He called the method "electrolization," but it later came to be known as "ionization." He did much to popularize the method, as did G. T. Fette, of Cincinnati; and H. B. Johnston, of Atlanta, later on. It remained for L. I. Grossman and J. L. T. Appleton, of Philadelphia, by a series of planned experiments, to place the technic of "ionization" on a scientific basis and to explain the rationale of the method.

Tricresol and formalin was introduced by J. P. Buckley, of Chicago, in 1906. Because of its powerful, persistent odor, this preparation became popular with many dentists throughout the country. It is still used by some.

In 1917, Percy R. Howe, of Boston, recommended ammoniacal silver nitrate for silver impregnation of pulp tissue remnants and of the canal surface, the object being to sterilize and render infected tissue inert. Unfortunately, staining of tooth structure and occasional irritation of periapical tissue limited its usefulness.

BACTERIOLOGIC CONTROL

The rôle that bacteriology played in the treatment of pulpless teeth was extremely slight up to about 1900. It remained for an American dentist, W. D. Miller, to lay the groundwork of dental bacteriology and to point out the rôle bacteria played in causing disease and death of the pulp. While the cause was understood, apparently little attention was given to the rôle bacteria played during the treatment of pulpless teeth, and the "sight and smell" method of determining when to fill a canal continued to almost 1920.

The first to call attention to bacteriologic examination of the root canal before filling the canal was T. W. Onderdonk, of New York. As early as 1901, he wrote:

> I wish to suggest what I am pleased to call the scientific test, i.e., having a culture made from the cotton dressing, also from a fresh specimen taken after a thorough disinfection when we think the root is ready to fill, and with the aid of the bacteriologist, *know* when we have secured an aseptic root. . . . The tests of success in root treatment are: 1. The physical test; the absence of pain under temporary stopping. 2. The scientific

test; a culture from the cotton dressing; also from a fresh specimen taken after thorough disinfection when we *think* the root is ready to fill.

The importance of the bacteriologic test was stressed later by LaRoche and Coolidge, and has been emphasized by others since then.

X-RAY DIAGNOSIS IN ROOT THERAPY

The x-rays were discovered in 1895, but were not used to any degree by dentists until about twenty-five years ago. As a diagnostic aid, the x-rays are extremely valuable in root-canal practice, before, during and after treatment: before, for determining whether the tooth warrants treatment; during, for determining whether the canal has been widened or an obstruction has been removed so that the canal is patent throughout its entire length, or for determining whether the canal is being filled satisfactorily, and after, for checking up on the condition of the periapical tissue to determine whether the root-canal treatment has been successful.

E. C. Kells, of New Orleans, was the first dentist in this country to appreciate the diagnostic value of the x-rays. He first used the x-rays to determine whether a root canal had been satisfactorily filled by him. In 1899, he roentgenographed a tooth the root of which he had just filled with a lead wire.

In 1901, Weston A. Price, of Cleveland, pointed out the advantages of the x-rays in root-canal work and for diagnosis of pulpless teeth.

It was not until about 1910, after Hunter's castigation of the dental profession for the kind of dentistry then being practiced, that the x-rays came into more general use. His diatribe against "septic dentistry," perhaps more often observed in England, of which country Hunter was a native, than here, became a blessing in disguise because it led to more careful root-canal work.

ROOT-CANAL FILLING

At the beginning of the nineteenth century, root canals were not often filled, except with a few fibers of cotton. In 1802, B. T. Longbothom, of Charleston, recommended filling the roots of teeth when it was thought inadvisable to extract them. The first impervious root-canal filling, as mentioned, was made by Edward Hudson, of Philadelphia, who, as early as 1809, used gold foil for filling canals. Those who could followed suit, and also filled canals with gold foil. As may be expected, in the hands of less skilful operators, roots occasionally fractured from too vigorous packing of the foil. Others used more adaptable material, such as cotton, asbestos or wood, for filling root canals.

In 1867, G. A. Bowman, of Missouri, used gutta-percha for filling root canals, and a tooth the canals of which were filled by him is in the museum of Northwestern University Dental School. Edmund Noyes, of Chicago, however, states that his preceptor used gutta-percha for filling root canals prior to 1865. Bowman was also co-inventor, in 1873, with C. F. Allen, of the rubber dam clamp forceps.

By about 1880, the number of root-canal filling materials had greatly increased. In addition to gold foil, which was used as late as 1890 for filling root canals, tin-foil, lead cones, gutta-percha, plaster of Paris and oxychloride of zinc cement were used.

A solution of gutta-percha in chloroform, later known as chloropercha, was introduced by Bowman in 1883 for filling root canals. This solution, used in conjunction with gutta-percha cones, acquired considerable popularity among the members of the dental profession. It found its greatest advocate in M. L. Rhein, of New York, about a decade later. Dr. Rhein contended that the root end of every pulpless tooth should be "encapsulated" or covered with gutta-

percha to insure a hermetic seal of the foramen. He had many followers who sealed every root canal with a button of gutta-percha at the apex.

In 1890, C. T. Gramm, of Chicago, introduced copper points for filling root canals. He later gold-plated these copper points to prevent discoloration.

Gutta-percha points having a core of silver wire to overcome buckling of the gutta-percha while introducing the cone in the root canal were suggested by Beust in 1901. While they gave some rigidity to the gutta-percha cone, they had relatively little advantage over gutta-percha alone.

In 1912, Hermann Prinz, of Philadelphia, recommended a high melting point paraffin for filling root canals. He showed that, as the paraffin cooled, shrinkage occurred only in the center, so that a hermetic seal still remained around the periphery. The method did not become popular because the paraffin was found to be absorbable.

In 1914, J. R. Callahan suggested a varnish of chloroform and rosin for lining root canals prior to filling. It is interesting to note that Bowman tried a solution of shellac for root filling in 1867.

Precision fitting gold cones made to fit root canals previously prepared with a special set of engine reamers were introduced by C. J. Grove, of St. Paul, in 1929. The gold cone was cemented in place with a special root-canal cement.

A gold-tin amalgam was introduced by H. T. Stewart, of New York, in 1930. Ease of introduction and hermetic seal were claimed for it, but often the amalgam was forced through the apex, where it caused damage to the tissue. In many cases, staining of the tooth resulted.

In 1933, E. A. Jasper, then of St. Louis, introduced silver points having the same diameter and taper as root-canal reamers or files, which helped to simplify root filling. These points were used in conjunction with a special cement.

THE PULPLESS TOOTH TODAY

As our knowledge of bacteriology has increased, so has the demand for absolute removal of the pulp from the root canals, to be followed by complete sterilization and aseptic filling with a permanent material.

Through the period from 1895 to 1920, which may be designated as the trial and error period of root-canal therapy and which was to determine finally the question as to whether the pulpless tooth was to be permitted to remain in the mouth, we are chiefly indebted to the long and persistent efforts of the late M. L. Rhein, of New York, for the perfection of a technic that would warrant the retention of the pulpless tooth. Dr. Rhein was an able technician with a perseverance in the promotion of his beliefs that was equaled only by his patience in executing the root-canal operation. His dogmatic beliefs on this subject made him unpopular in the profession, but it may be truthfully said that he sacrificed his own personal popularity for the sake of popularizing a procedure in which he thoroughly believed.

The x-rays may be credited with being the one factor, aside from the success of any one method, that turned the tide of argument for the root-canal therapist. Its use in "seeing" what was happening in the tooth root was brought out in the first years of the twentieth century by Kells, Price, Van Woert and others, but it remained for the most ardent advocate of saving the pulpless tooth, M. L. Rhein, to devise a technic for use of the x-rays in root-canal work, in 1908. It was only two years later, however, that Hunter condemned bridgework as a whole because of the unsound pulpless teeth upon which it was built in many instances. This had immediate repercussions because the soundness of root-canal practice was vigorously challenged.

Then followed a period in which

many methods were devised and advocated for safe and adequate root-canal procedure, and it was through this period of trial and error, of doubt and questioning, that the faith of the most valiant in their ability to save teeth was sorely tested; and it was mainly through the indefatigable efforts of men here present that the principle of the preservation of the pulpless tooth has survived.

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TRAUMATIC CYSTS OF THE MANDIBLE: REPORT OF A CASE

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NOW and then, a case is presented to the dental practitioner which is not only of clinical, but also of special pathologic significance. Such a situation is encountered with the traumatic or hemorrhagic cyst of the mandible.

Despite the similarity in appearance of this type of cyst and the more common odontogenic cystic formations, it is a separate and rather unusual pathologic entity. The treatment is akin to that employed with other cysts, but certain salient characteristics and the infrequency of occurrence of this type warrant reporting of a typical case and a discussion of its distinctive features.

ETIOLOGY

The exciting cause in the formation of a hemorrhagic cyst is trauma. The actual blow or accident may be remembered by the patient, but usually the incident is vague, because of the time interval between the occurrence of trauma and the onset of the immediate symptoms. The person cannot conceive of a relationship between an accident that occurred months or even years before and the present complaint.

Patients have cited trauma occurring two weeks before the appearance of signs, some a few months and others a few years. Auto accidents and the mishaps of various youthful athletic events comprise the great majority of reported instances of trauma.

Von Haberer, as quoted by Blum,[2] believes that, in addition to trauma, there might be some predisposing etiologic factors. He postulates that an individual peculiarity of a blood vessel wall or of the coagulation of the blood may play a rôle. Were it merely a matter of trauma, according to his view, there would not be the marked inconsistency in the frequency of formation of hemorrhagic cysts. Blood studies in reported cases fail to provide any evidence for this view.

Occasionally, in addition to the exciting cause of trauma, there may be a definite predisposing condition leading to hemorrhage. Darlington points out, in Seldin's[6] case, that "a possible basis for such a condition might be a severe blow in the region of a partially healed extraction, where bleeding occurs in the still friable granulation tissue and no exit for drainage exists because external healing of the mucous membrane is complete."

SYMPTOMS

The clinical findings are fairly constant, although not striking. Initially, the patient notes a slight painless enlargement of the involved region of the body or ramus of the mandible. Occasionally, there is a dull pain, increasing in severity with the encroachment of the cystic cavity upon the inferior alveolar nerve and its branches to the apices of the teeth adjacent to the cavity.

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There is little tendency for the cyst to involve these vital structures. The roots of the teeth are protected by peridental lamellae, and the mandibular canal itself is covered by dense bone.

When the inferior alveolar nerve is involved, the most frequent site is the mental foramen where the nerve exits from the canal. In such instances, a dull sensation of pain or even a paresthesia may develop. Should the teeth become involved, their pulps become necrotic and suppurate.

In some instances, a fistulous tract may be formed between the cyst and either the exterior or the oral cavity, depending on the path of least resistance for perforation. Extraction of a tooth be-

Fig. 1.—Preoperative occlusal roentgenogram showing extent of cyst, from right first premolar to left second premolar.

cause of the symptoms of pulpitis caused by encroachment of the cyst upon the apices of the teeth may also open the way for intra-oral drainage. The patient will complain of a disagreeable taste in the mouth.

ROENTGENOGRAPHIC FINDINGS AND DIFFERENTIAL DIAGNOSIS

The x-ray findings are very important in the discovery and course of treatment of traumatic cysts. An adequate differential diagnosis can be made merely by their proper interpretation. The size of the cyst, its location and the nearby anatomic landmarks, all valuable information, are also determined.

The cystic cavity appears on an x-ray film as a fairly well defined circumscribed area. It is usually somewhat irregular in outline and has no apparent relation to the apices of the adjoining teeth. These teeth have a distinct peridental lamella about the roots. As pointed out by Blum,[2] a traumatic cyst lacks the distinct bordering bony line so typical of radicular and follicular cysts and thereby may be differentiated from these cysts. In addition, where residual radicular cysts are present, a missing tooth is noted. (It must be remembered that a traumatic cyst may also exist in an edentulous area.) A dentigerous cyst contains a tooth held within its cavity and is thus distinguished from a traumatic cyst.

Fig. 2.—Preoperative intra-oral roentgenogram showing extent of cystic area.

Other pathologic conditions from which traumatic cysts must be distinguished are osteitis fibrosa cystica, ameloblastoma, carcinoma, benign giant cell tumor and perhaps osteomyelitis.

Osteitis fibrosa cystica is distinguished by a not very well defined margin, with bony trabeculae extending in irregular fashion. Occasionally, it may be multilocular, although it usually is monolocular. When it is of the generalized type (von Recklinghausen's disease of bone), there are other bony cystic formations, and the blood exhibits a calcium-phosphorus imbalance.

On the films, ameloblastomas are multilocular and have rather irregular bony

outlines. Carcinomas of the mandible present an irregular diffuse outline without any distinct borderline. They are, in most instances, secondary to a lesion elsewhere in the body. Benign giant-cell tumors are somewhat lobulated and show bony trabeculae on the x-ray film. Finally, osteomyelitis in a typical stage presents a moth-eaten appearance of the bone.

A diagnosis of traumatic cyst of the mandible may be based on: (1) a history of trauma; (2) the roentgenographic examination; (3) histopathologic study (to be discussed later on); (4) the age of patient (usually a young adult), and (5) the clinical appearance.

Fig. 3.—Preoperative left lateral view.

PATHOGENESIS

The trauma involved would, in most instances, result in a fracture of the mandible. However, in young patients, the bone is resilient and, instead, an intermedullary hemorrhage occurs. The bone is completely intact, there being no communication between the hemorrhagic area and the surrounding soft tissues.

The hematoma increases local pressure and thereby interferes with lymphatic circulation and venous return from the marrow. Stasis ensues and the marrow becomes edematous and inflamed. Enlargement of the cystic cavity results from the continuous pressure of the contained serous transudate and the irritating influence of the decomposing fibrin. The bony trabeculae of the spongiosa become resorbed and displaced. Of course, if secondary infection sets in, the cavity enlargement is accelerated.

The area is encapsulated by a fibrous membrane formed from the adjoining marrow spaces and not by epithelium. This is a means of distinguishing the lesion from odontogenic cysts. The cortex of the mandible is usually unaffected. However, at times, it undergoes slight hypertrophy because of the pressure upon it.

TREATMENT

Surgical intervention is necessary. The cystic cavity may be exposed through either an extra-oral or an intra-oral incision. The choice will depend on

the location of any fistulous tract and on the accessibility and size of the cystic cavity. Large inaccessible cysts should be opened from the exterior.

In each instance, the bony cavity must be adequately exposed, the overlying bone decorticated and the contents thoroughly evacuated. Gentle curettage is then instituted and the cavity is well packed with strips of vaselin gauze. It is kept open and repacked at short intervals with less and less gauze, so that granulation tissue may fill in. Irrigation with a normal saline solution or potassium permanganate (1:5,000) may also be employed.

It is good surgical practice to excise any area of a draining fistulous tract all the way down to the bone. This will insure healing, as only healthy tissue remains.

Local anesthesia is satisfactory in these operations. A mandibular block injection is given and the entire affected area infiltrated with a 2 per cent procaine solution (with epinephrine 1:50,000). If necessary, general anesthesia may be used.

During the operative procedure, one must be careful to inspect the condition of the roots of the nearby teeth. Should they be exposed, extraction is indicated. Any nerve remnants, for example that of the mental nerve, should be carefully removed to prevent any future neuralgic pain.[9]

Treatment by means of aspiration may also yield results, but presents two pitfalls. For one thing, a diagnosis cannot be confirmed without a histopathologic section, and a malignant lesion may be overlooked. Secondly, a bulging cystic wall may remain and an abnormal bony contour result.

As regards the bony contour, at times an external pressure bandage may be necessary postoperatively to completely collapse a cavity. On the other hand, if too much bone is removed by external incision, an indentation remains after the cavity has been filled in by granulation, and plastic repair may be necessary.

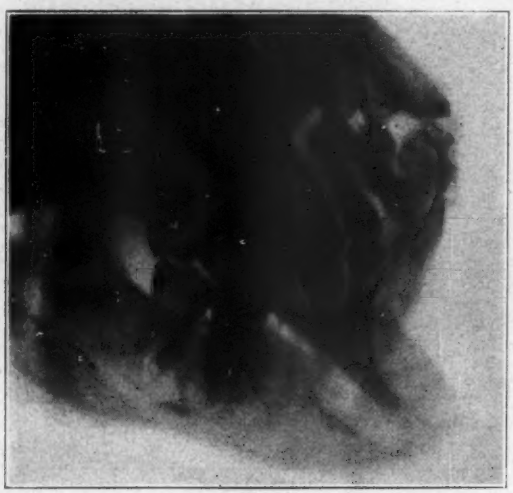

Fig. 4.—Preoperative right lateral view.

If a pathologic fracture is a probability, it is a good policy to insert either arch wires or a splint prior to operation. Should a fracture occur, these devices permit treatment of the condition as an ordinary fracture, and normal relationship of the teeth is maintained. If general anesthesia is contemplated, acrylic should not be used for a splint because of the tendency to deteriorate under ether fumes.

Postoperatively, periodic roentgenographic examination is in order, to determine the progress of bony repair. Also, pulp testing of the teeth adjacent to the cystic area should be carried out, since the teeth may have been injured during the operative procedures within the cystic cavity.

A word must be said concerning what might be called prophylactic treatment. Every accident associated with trauma to the mandible should have immediate and periodic x-ray study so that any pathologic condition may be discovered early and be treated before extensive damage occurs. Both sides should be filmed because, occasionally, large radiolucent areas of cancellous bone are normally observed.

HISTOPATHOLOGY

Blum[2] has made an extensive study of the microscopic picture of a hemorrhagic cyst. He states that "the innermost layer is that of more or less changed blood—sometimes organized and in others a homogeneous hyaline mass with cell débris or masses of blood pigment."

Fig. 5—Section of cystic "lining"; showing typical granulation tissue, giant cells and erythrocytes. (×90.)

There is no epithelial lining, as found in other cysts. Moreover, as Thoma[10] points out, odontogenic cysts contain extensive collagen fiber bundles that per-

mit their enucleation *in toto,* whereas hemorrhagic cysts are not so encapsulated. He reports considerable thickness of fibrous granulation tissue lining the cavity of the traumatic cyst. Schneider[8] found occasional foreign body giant cells.

According to Thoma[11]:

> The bone adjoining the cyst membrane shows evidence of lacunar resorption and peripheral apposition, the marrow is somewhat more cellular and fibrous than normal, with evidence of stasis in the enlarged vessels and occasional inflammatory infiltration. It does not, however, give the picture of osteitis fibrosa.

When a fistulous tract is present, the surface epithelium may grow into the cystic cavity, but its growth does not obscure the true histologic picture of the cystic lining. This was reported by Schneider[8] and also occurred in the case to be presented.

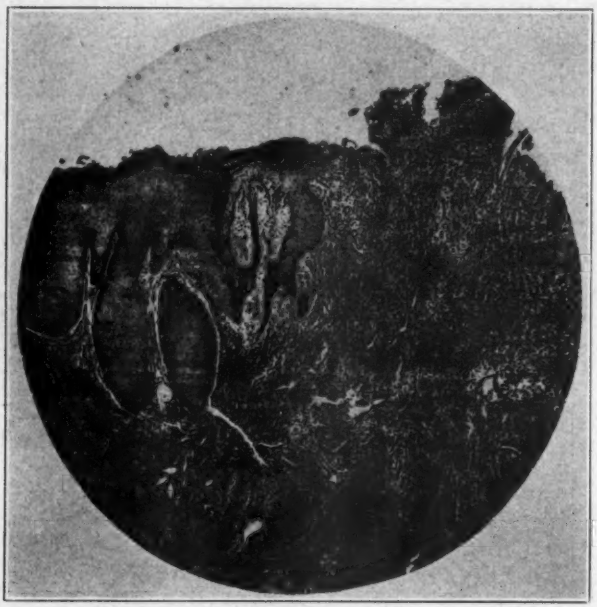

Fig. 6.—Section of cystic "lining" taken at point where invaginated stratified squamous epithelium of skin joins typical granulation tissue of cyst. (×70.)

REPORT OF CASE

History.—September 23, 1943, a Negro boy, aged 17, came to the dental clinic complaining of an "abscess" in the submental region.

Interrogation of the patient and his mother revealed that five years previously he had been struck by an automobile and required hospitalization for three months. Contact was made with the institution to which the patient was admitted at that time. The pertinent portion of its report reads:

"Physical examination revealed bleeding from anterior nares and multiple contusions and abrasions. There was a systolic apical and basal murmur. Pupils unequal. Eyes deviated to right. X-ray picture of skull showed no fracture. Urine and blood negative."

Examination.—Examination revealed two

fistulous openings below the symphysis. An occlusal film showed a radiolucent area extending from the right first premolar to the left second premolar and encompassing most of the mandible (Fig. 1). Further roentgenographic examination (intra-oral films and lateral plates, Figs. 2, 3 and 4) definitely established the presence of a serious jaw condition. The fistulous tracts were widened to admit of better drainage under topical anesthesia with ethyl chloride.

(From the history and roentgenographic examination, a tentative diagnosis of traumatic cyst of the jaw was made and the patient was hospitalized, October 1, for further treatment.)

Examination at that time revealed that the mandibular left incisors were painful to percussion, and the area of swelling, described by the resident surgeon as the size of a walnut, was slightly sensitive on pressure. All teeth in the cystic area were found vital on pulp testing. No cervical glands were palpable and the patient was afebrile. The blood pressure was 120/85 and a complete physical examination revealed nothing abnormal, except for two scars in the thoracolumbar region of the back.

Roentgenographic examination of the long bones failed to show any pathologic condition. Blood chemistry tests October 20 revealed calcium, 10.8 mg.; phosphorus, 3.1 mg., and phosphatase, 3.2 mg., per hundred cubic centimeters. These findings ruled out the possibility of generalized osteitis fibrosa cystica. The Kline test proved negative, ruling out a syphilitic background. The blood sugar was 79 mg. per hundred cubic centimeters, ruling out diabetes. The urine was free from albumin and sugar. A complete blood count taken on October 11, 1943 revealed: 92 per cent hemoglobin and 6,600 white blood cells; polymorphonuclear leukocytes, 52 per cent; lymphocytes, 39 per cent; monocytes, 6 per cent; eosinophils, 2 per cent; staff cells, 1 per cent. Bac-

Fig. 7.—Lateral view taken few days after operation and showing splint in place.

Fig. 8.—Intra-oral roentgenogram taken three months after operation; showing filling in of bone.

teriologic examination, October 7, revealed *Micrococcus tetragenous* from the fistulous opening, while a smear showed gram-positive diplococci.

Preoperative Measures.—Since a pathologic fracture on operation was a definite possibility, an impression of the lower jaw was taken and a simple lingual intra-oral vulcanite splint was constructed. Holes were drilled in the vulcanite at points corresponding to the interproximal spaces, and, October 12, the splint was wired to the posterior teeth through the holes.

Operation.—October 13, the patient was given morphine sulfate, one-sixth grain and scopolamine, one-two-hundredth grain and, half-hour later, was brought to the operating room. Under bilateral intra-oral inferior alveolar nerve block and local infiltration of the skin with a 2 per cent procaine solution, with epinephrine, 1:50,000, the area of the draining sinus was excised down to the bone, and the skin and periosteum were reflected laterally about 1 inch. The outline of the cyst was determined and enough bone removed for adequate exposure. About 15 cc. of a thick, viscid yellow fluid was obtained. The cavity extended to the premolar region on both sides. The only discomfort suffered by the patient was experienced during curettage of the cyst walls when the curet came close to the apices of the lower anterior teeth. A degenerated cystic lining seemed to be present.

Pathologic Examination.—A specimen of this "lining" was sent for pathologic examination. The inferior border of the mandible was intact and healthy. The cystic fluid proved to be sterile after two days' incubation. On examination of the curettings, J. G. Sharnoff, M.D., made a diagnosis of "granulation tissue; foreign body granuloma." The stratified squamous epithelium in the sections contained hair follicles and sebaceous glands, indicating its origin from the skin invading the cavity through the fistulous opening. (Figs. 5 and 6.)

Course.—The patient was hospitalized for one week after operation. The original packing was removed and the cavity repacked before discharge to the dental clinic. During his stay in the hospital, he was comfortable, complaining only of a slight pain in the lower anterior teeth two days after operation. Codeine sulfate 1 grain and acetyl salicylic acid 10 grains were given to control this pain. The temperature varied from 98 to 100° F., the pulse, from 60 to 120, two days after operation.

Therafter, the patient reported to the dental clinic twice a week. The external dressing was changed at each visit and the packing every other time. After a week, the exudate became foul smelling and the cavity was irrigated with potassium permanganate 1:5,000 at each visit. Vaselin gauze was packed, with less pressure each time, to allow granulation tissue to form from within.

Fig. 9.—Occlusal roentgenogram taken seven months after operation.

Fig. 10.—Occlusal roentgenogram taken nine months after operation.

The teeth remained vital at all times. The splint was retained for two months so that the patient, who felt that his jaw was weak and might break, would have psychologic support. Roentgenograms taken periodically showed definite filling in of the bone. (Figs. 7, 8, 9 and 10.)

Comment.—The initial diagnosis of traumatic cyst of the mandible, based on the history, clinical appearance and roentgenograms, was corroborated by subsequent histopathologic findings. The findings agree in substance with those of Blum, Thoma and Schneider. No epithelial lining was found and all teeth were vital. Wherever possible, other types of pathologic conditions of the jaw were ruled out. The incision was made externally because of the extent of the cyst and its inaccessibility by intra-oral approach. At this writing, nine months after presentation of the case in the clinic, there is considerable filling in of bone, but a slight tissue exudate persists. There is dimpling of the skin below the symphysis where the incision was made, but it is not disfiguring.

ACKNOWLEDGEMENT

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VITAMINS AS AN ADJUNCT IN THE TREATMENT OF PERIODONTAL DISEASE

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THE mere absence of disease does not imply buoyant health. Health has many gradations, extending from buoyant or maximum health all the way down to the borderline of disease. Optimum nutrition can assure buoyant health if no anatomic or functional limitations are present.

Commenting on the importance of nutrition, Russell M. Wilder, chairman of the Committee on Food and Nutrition of the National Research Council, writes:

> When the story of the control of malnutrition can finally be told it may not be quite so dramatic a tale as that of the eradication of cholera and typhoid, but the advantages to the public health from such control will, in my opinion, match in importance what has been accomplished in sanitation. Typhoid either kills or ultimately relaxes its hold. Nutritional deficiency saps vitality in so insidious a way that the victim may be unaware that enough is wrong to call a doctor. . . . The milder degrees of nutritional deficiency, although they are neither fatal nor completely incapacitating, constitute the nub of the problem of malnutrition. They interfere with sleep, so that rest is disturbed. They wreck courage. They undermine the will to do. They seriously depress resistance to other diseases, and, in women, contribute to the occurrence of complications during pregnancy. The prevalence of milder degrees of malnutrition, in the opinion of those who are best informed, accounts for . . . a considerable part of the relief rolls. The undernourished are unable to hold jobs if they find them; they become unemployable.

A person may be apparently well. He may go to business, do a hard day's work, and yet not have buoyant health. Fatigue may be part of his daily life. He accepts manifestations of atrophic changes because he has adapted himself to such common complaints as headache, backache, pain in the arms and legs, poor appetite, toothache and bleeding of the gingivae. True, these conditions exist in a majority of the population, and yet they cannot be accepted as normal. They are the complaints of average people existing on a subsistence level maintained by an average diet. Average diets have been shown to be deficient in essential minerals and vitamins, with too high an intake of refined carbohydrates (sugars, candy, cakes and pastries).

Health to the nutritionist today means buoyant health: better eyesight; better hearing; freedom from aches and pains; greater resistance to infections, such as the common cold; reduction in the rate of atrophic changes such as arteriosclerosis, and an increased life span, with extra years added in the prime of life.

Dentistry has up to the present failed to fulfil its full obligation as a health service. There are many reasons and logical explanations for this fact. One of the most important is that 70,000 dentists cannot adequately correct the dental diseases of even 25 to 30 per cent of the people. It is also a known fact that only a small portion of the 30 per cent receiving adequate dental care are enjoying the benefits of modern dentistry.

How can we cope with this problem?

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The best answer by far was given by the Scandinavian countries before the Nazi cloud engulfed them. They learned that even minimum remedial operative procedures would be a colossal, if not an impossible, undertaking. The problem was approached by educating parents on dietary principles.

The "Oslo breakfast" was instituted in order to insure a daily intake of optimum minerals and vitamins in the diet. Along with this diet, the dental defects of all school children were corrected. The improvements produced in general and oral health are indisputable, as must be recognized by the dentist. The discovery of nutritional deficiencies by means of routine oral examination and the institution of vitamin therapy and improvement of dietary intakes are important responsibilities of the dentist.

Fig. 1.—Condition before vitamin therapy. Hypertrophy, edema and congestion are present (severe chronic scurvy).

Fig. 2.—Condition one month later. (Compare Fig. 1.) Ascorbic acid, 300 mg. daily, was given. There is reduction in hypertrophy, with a tendency of the tissue to return to normal. Vitamin therapy is to be continued for at least a year, along with local treatment for gingival disease.

Physicians and research workers consider the tongue, teeth and gingivae the mirror of physiologic activities. Dentists are much better equipped to interpret aberrations of the gingivae and thus recognize systemic disturbances reflected therein.

According to Miller,[1] the dietary causes of caries and periodontal diseases can be divided into two general classes: (1) local, or extrinsic and (2) systemic, or intrinsic.

The local conditions may be influenced or corrected by alterations in the daily diet. Such changes can be accomplished readily by eliminating the non-detergent, acid-producing foods, such as candies, cakes, pastries and white bread, which lack essential vitamins and minerals, and replacing them with detergent, alkali-producing foods containing essential vitamins and minerals, such as raw salads, whole grain breads and cereals, milk, fruit, eggs, organ meats, potatoes and raw and steamed vegetables in the daily diet.

The systemic conditions may be influenced by all the conditions that affect the teeth and supporting structures, in addition to the local physical effects of food on both the hard and the soft structures of the dental apparatus.

Deficiency states may be caused also by the following conditions (modified from Jolliffe)[2]:

1. Indigency or low incomes.
2. Erroneous dietary habits and food idiosyncrasies; e.g., excessive use of refined sugar, candy, pastries, cakes, chocolate flavors and soft drinks.
3. Excessive consumption of alcohol, refined starches or mineral oil.
4. Diseases altering nutritional requirements:

(a) Hyperthyroidism.
(b) Fever, especially of long duration.
(c) Gastrointestinal disturbances, colitis, achlorhydria, vagotonic spasms.
(d) Pregnancy.
(e) Rapid growth.
(f) Increased excretion; diarrhea; polyuria; lactation.
(g) Nervous states.

5. Food fads.

6. An edentulous state or wearing of inefficient dentures.

It is because of these conditions, in addition to inadequate consumption, soil depletion and unsatisfactory transportation, marketing and cooking, that most of the population is in a state of malnutrition. A problem presents itself when virtually all our patients (three-fourths of the population have some form of "hidden hunger" or malnutrition) fall into one of the foregoing categories. Kruse aptly says:

> More properly, the term "deficiency disease" should connote a deficiency in the bodily tissues rather than in the diet. Indeed, its meaning should be even broader: it should include not only a deficiency but also any metabolic disturbances of the essential in the tissues. The causes may be complex. They may be conveniently classified as external and internal. Dietary deficiency is the most common external cause. Any bodily condition interfering with digestion, transport or utilization, prompting destruction or excessive excretion, or raising the requirements of the dietary essential is for example an internal cause. Almost every non-nutritional disease affects nutrition. A cause comes about through a combination of circumstances. For example, assuming a satisfactory internal mechanism, a deficiency disease from insufficient intake relative to age, activity, exposure to light, storage, state of tissue and probably other factors.

Kruse has shown that apparently well persons manifest some form of deficiency state. Most of the significant changes were observed with the aid of a biomicroscope. The changes brought about in the gingivae and the tongue with the aid of vitamin therapy were reported by him in two excellent papers.[3, 4]

Tongue changes were effected by giving 200 mg. of niacinamide daily for

Fig. 3.—Condition before treatment; cheilosis, or perlèche. The patient came in for periodontal treatment, with a "sore" in the corner of the mouth, present for a year. There is a urea-like frosting of the lower lip at the mucocutaneous junction. The cracking, or fissuring, at the angles of the mouth is an advanced ariboflavinosis.

Fig. 4.—Condition after vitamin therapy. (Compare Fig. 3.) Riboflavin, 5 mg., plus two yeast tablets three times a day was given after meals from September 25 to October 16, approximately three weeks. The fissuring at the angle of the mouth and the urea frosting of the lower lip have disappeared. A pain in the right forearm disappeared at the same time.

TABLE 1.—VITAMIN THERAPY EMPLOYED IN PERIODONTIA DEPARTMENT, NEW YORK UNIVERSITY COLLEGE OF DENTISTRY*†

Deficiency Vitamin	Oral Signs as Seen by Dentist‡	Prescription (Refilled as Necessary)
A	Keratinization and hypertrophy of gingivae	Vitamin A (25,000 I.U. tabs) No. 100, 6 tablets a day after meals for six months to a year.
Niacin (nicotinic acid)	Scarlet tongue; smooth atrophy of the lateral borders and tip of the tongue; painful, sore, fissured and corrugated tongue; may influence redness of gingivae along with avitaminosis C; stages from mildly acute to severe chronic may be seen	Niacinamide (100 mg. tablets) No. 100, 1 tablet 3 times a day after meals.
Thiamine B	Neuralgic pains in and about the mouth; dry socket; aphthae	Thiamine hydrochloride (10 mg. tabs) No. 100, 1 tablet with 1 yeast tablet and 100 mg. of ascorbic acid 3 times a day after meals; usually used in conjunction with riboflavin, niacinamide and ascorbic acid.
Riboflavin (B_2)	Purplish red or magenta tongue; cheilosis; cracking at corners of mouth	Riboflavin (5 mg. tabs) No. 100, 1 tablet and 1 compressed yeast tablet 3 times a day after meals.
Vitamin C (ascorbic acid)	Gingivitis; easy bleeding of gingivae; edema of gingivae; slow healing; may also be used preoperatively and postoperatively to hasten healing and in treatment of necrotic gingivitis	Ascorbic acid (100 mg. tabs) No. 100, 2 tablets after each meal 3 times a day for six months to one and one-half years.
D	In adults, red marginal gingivitis (S. C. Miller); in children, as result of deficiency in infancy, poor tooth formation (tooth structure cannot be improved by vitamin therapy; for gingivae signs and alveoloclasia and to preserve ridges under prosthetic appliances, use in conjunction with high calcium diet)	2 tablespoons of cod liver oil every day; 3 glasses of milk taken at mealtime for at least a year for adults (vitamin D potency of product should be checked on label).
Mild polyvitamin and mineral deficiencies	Poor oral health in general, tissue bloated and coated; alveoloclasia active in general	6 brewers yeast tablets and 1 teaspoonful of cod liver oil daily; balanced diet with minerals and vitamins in abundance (for maintenance dose, commercial vitamin products may be used).
Subclinical	Any of the foregoing symptoms in moderation or as voted by capillary microscopy or slit-lamp technic; vague, confused, indefinite complaints or complaints of unknown etiology in and about mouth	Ascorbic acid 75 mg., riboflavin (B_2) 5 mg., thiamine HCL (B_1), 10 mg.; niacinamide 50 mg. ft., capsule or tablet, 1 tablet or capsule 3 times a day after meals for ten days, thereafter once a day until all symptoms disappear

*Miller, S. C.: Oral Diagnosis and Treatment Planning, Ed. 2. Philadelphia: P. Blakiston's Son and Co., Inc., 1944.

†Caution: Specific vitamins are to be used for definite clinical conditions, only U.S.P. and C.P. products accepted by the Council on Therapeutics of the A.D.A. being used. Vitamins are best taken immediately after or with meals. It is safe to use the foregoing doses unless the patient complains of unusual symptoms or the prescription indicated is contrary to the advice of the physician.

‡Local causes in addition to the systemic conditions are usually present even though not mentioned in this outline.

from one to one and a half years. The changes in the pattern of the tongue were recorded by kodachrome photographs.

The New York University Periodontia Research Group made tests on the gingivae. Many improvements could be achieved only by giving 500 mg. of vitamin C daily to patients for from one to one and a half years. Some changes can be seen only with the aid of the biomicroscope. However, many of the macroscopic changes in the gingivae can be seen by dentists. In acute cases, quicker reactions may be expected. These changes are demonstrated in the accompanying illustrations.

Patients in the Periodontia Department of New York University College of Dentistry who apparently had gingival disease were given 500 mg. of vitamin C daily. Photographs were taken before and after administration. Marked changes were noted in tone, color and consistency. A purplish red, bloated, edematous, swollen condition of the gingivae was converted to a pink, firm even tone without edema. Gingival hemorrhage also was reduced, in most cases. (Figs. 1 and 2.)

The same procedure was followed in the treatment of cheilosis and cracking or fissuring of the corners of the mouth. Patients were given 5 mg. of riboflavin (B_2) with two tablets of compressed yeast three times a day after meals. Definite healing resulted. (Figs. 3 and 4.)

Figures 5 and 6 show the results of treatment with 100,000 units daily of vitamin A.

Figures 7 and 8 show the effects of administration of 1500 mg. of vitamins C daily for two days in a case of acute necrotic gingivitis superimposed on hypertrophy (resulting from dilantin therapy). Vitamin therapy was instituted after failure to respond to three weeks of routine treatment for necrotic gingivitis.

TABLE 2.—VITAMIN VALUES

VITAMIN A

The international unit of vitamin A is defined as the vitamin A activity of 0.6 microgram of pure beta-carotene. The U.S.P. unit is equal, in growth-promoting and antiophthalmic activities for the rat, to one international unit. The U.S.P. reference cod liver oil contains at least 850 U.S.P. units of vitamin A per gram.

THIAMIN HYDROCHLORIDE (VITAMIN B_1)

The U.S.P. Unit of vitamin B is defined as the vitamin B_1 activity of 3 micrograms of the U.S.P. reference standard thiamine hydrochloride, and is equal in value to one international unit of vitamin B_1. One U.S.P. or international unit of vitamin B_1 is approximately equivalent to two Chase-Sherman units; 0.5 Smith-curative unit; 20 Cowgill mg. equivalents. One milligram of vitamin B_1 contains 333 U.S.P. or international units.

RIBOFLAVIN (VITAMIN B_2)

The Bourquin-Sherman unit is equal to that amount of source material which, when fed daily to a standard test animal, will support a growth rate of 3 gm. per week. Investigators have reported that 2.5 micrograms of pure riboflavin will support this growth rate. There is no international unit for riboflavin. Pure riboflavin may be used as the reference standard and, according to assays, 1 mg. contains approximately 400 Bourquin-Sherman units.

ASCORBIC ACID (VITAMIN C)

The U.S.P. unit of vitamin C is defined as the vitamin C activity of 0.05 mg. of the U.S.P. reference standard ascorbic acid, and is equal in value to one international unit of vitamin C. One milligram of vitamin C equals 20 U.S.P. or international units. One cubic centimeter of fresh lemon or orange juice has a potency of approximately 10 U.S.P. or international units of vitamin C.

VITAMIN D

The international unit of vitamin D is defined as the vitamin D activity of 1 mg. of the international standard solution of irradiated ergosterol, which is equal to that of 0.025 microgram of crystalline vitamin D, or calciferol. The U.S.P. unit of vitamin D is defined as equal, in antirachitic potency for the rat, to one international unit of vitamin D. The U.S.P. reference standard cod liver oil contains 95 U.S.P. units of vitamin D per gram. U.S.P. cod liver oil contains at least 85 U.S.P. units of vitamin D per gram. Viosterol is frequently labeled 250 or 150 D, which means that it contains 250 or 150 times the vitamin D content of U.S.P. cod liver oil. Activated ergosterol in oil U.S.P. (viosterol) contains not less than 10,000 U.S.P. units vitamin D per gram.

The following replies are made to commonly asked questions:

1. *Can high vitamin doses in any way harm the patient?*

There is no evidence that doses even 100,000 times greater than those advocated in this paper will in any way harm the patient.

2. *Are parenteral injections better than administration of vitamins by mouth?*

There is nothing in the literature to indicate that the parenteral route is better than the oral route. Only in rare cases, such as intestinal disorders (e.g., colitis), is the parenteral method indicated. Giving vitamins by mouth may even enhance the absorption of certain vitamins because of the phosphorylization that takes place in the alimentary canal.

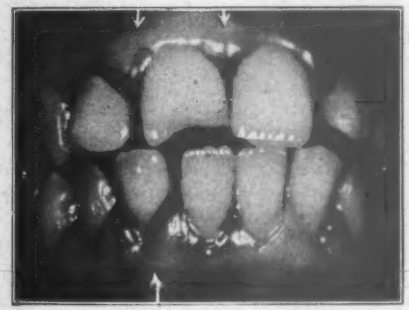

Fig. 5.—Condition before vitamin therapy; showing edema, congestion and hypertrophy (possible avitaminosis A). Calculus was not removed nor was toothbrushing taught.

Fig. 6.—Condition after treatment. (Compare Fig. 5.) Vitamin A, 100,000 international units, was given daily from July 21 to November 2, with reduction in edema, hypertrophy and congestion. The acne on the patient's face disappeared in two weeks.

3. *Should a dentist prescribe vitamins?*

For the following reasons, it is obligatory for dentists to be prepared to advise dietary changes and prescribe vitamins.

(a) The medical profession sees in the mouth signs of nutritional deficiencies; e.g., pellagra, tongue and mucous membrane changes; scurvy, gingival changes, and tongue and lip changes (riboflavin deficiency).

(b) A large majority of the population have some form of malnutrition.

(c) Patients coming to the dentist are apparently well and usually are not under the care of a physician. A large majority of these patients need some form of dietary advice. Many may need vitamin therapy.

(d) When prescription by the dentist interferes with medical prescription for specific diseases, the physician should be consulted and his recommendations allowed to take precedence.

4. *What are the reasons for failure in vitamin therapy?*

(a) Failure to give sufficient dosage of vitamins for a long enough period of time; e.g., 500 mg. daily of vitamin C for a year.

(b) Attempts to treat long-standing vitamin deficiency diseases by ordinary dietary means.

(c) Failure to take into consideration conditions that may interfere with the absorption of vitamins by the tissues; such as colitis, alcoholism and excessive ingestion of mineral oil.

(d) Administration of vitamins before meals. Vitamins act best in an acid medium and should be taken after meals.

CONCLUSIONS BASED ON CLINICAL EXPERIENCE

1. The majority of patients have some form of avitaminosis, usually of a multiple nature.

2. Vitamin C should be given in sufficient dosage to reach the gingivae as well as other tissues of the body.

3. Vitamin C, 500 mg. daily, will improve and maintain the health of the gingivae to a better degree than local treatment without vitamin therapy. Administration over a long period, e.g., a year or a year and a half, is beneficial and will do no harm.

4. Because of the many conditions present, 500 mg. of ascorbic acid (vitamin C) was found to be the dose required to alter the condition of the majority of the chronically affected tissues.

5. There is a possibility that vitamins have a special affinity for certain tissues, such as vitamin C for the gingivae; niacin for the tongue, and riboflavin (B_2) for the lips.

6. Treating gingival conditions by dietary means alone is not adequate, if one is seeking the optimum nutrition and health of tissues.

7. Removal of calculus subgingivally and supragingivally as well as elimination of pockets, equilibration of occlusion and stimulation of the gingivae by correct massage cannot be replaced by vitamin therapy. All etiologic factors must be eliminated if success in the treatment of periodontal disorders is to be achieved.

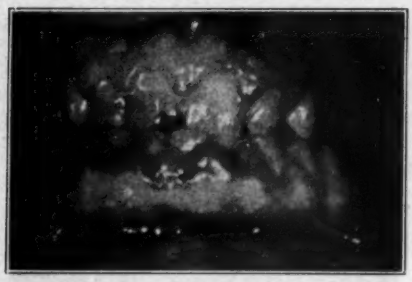

Fig. 7.—Condition before vitamin therapy; acute necrotic gingivitis superimposed on dilantin hypertrophy. All the classical symptoms were present and failed to respond after three weeks of the usual treatment for necrotic gingivitis.

Fig. 8.—Condition forty-eight hours later. (Compare Fig. 7.) Administration of Vitamin C, 1,500 mg. daily, dissipated the subjective symptoms. Reduction in hypertrophy, congestion and edema is evident.

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156 East Fifty-Second Street.

PENTOTHAL SODIUM ANESTHESIA: INDICATIONS AND CONTRAINDICATIONS

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AFTER twenty years' practice, in which I have used all the agents available for analgesia, I consider intravenous pentothal sodium the best general anesthetic for use in oral surgical operations. I have used it in 95 per cent of surgical cases during the last four years, in an experience covering 12,000 cases.

The first intravenous anesthesia recorded was administered by Sir Christopher Wren, English architect, who planned St. Paul's Cathedral and the reconstruction of London after the Great Fire. In 1656, he, with a chemist, Robert Boyle, injected opium into a dog's veins until the animal became drowsy and reeled as he walked.

Chloral hydrate was first used in 1875, and since then a great number of drugs have been used intravenously to produce anesthesia. In 1929, sodium amytal was used and the trend to use of the barbiturates started. Nembutal (pentobarbital sodium) appeared in 1930 and evipal in 1932. Pentothal sodium was introduced in 1934, as the result of research work by the Abbott Laboratories, which had experimented with various barbituric acid salts in order to find a more satisfactory intravenous anesthetic. This salt, which was discovered to be a powerful hypnotic, is, when injected intravenously, eliminated rapidly from the body. The fact that it is so rapidly eliminated makes its use controllable when it is injected slowly and intermittently, and thus assures a rapid recovery.

Pentothal sodium (sodium ethyl thiobarbiturate) is a bitter lemon-colored powder, smelling slightly like sulfur. In solution, it can be safely used up to forty-eight hours, provided it has not become discolored.

A history should be taken of each case. The blood pressure should be taken and urinalysis should be made, if the patient is under treatment by a physician. The physician should be consulted and his consent obtained before any general anesthetic is administered. All of our office practice patients are ambulatory. On making the appointment, they are instructed not to eat anything for four hours preceding the operation. The stomach must be empty, likewise the bladder and bowels. Patients are asked to attend to these eliminatory requirements immediately before the operation.

Pentothal sodium should be administered only by a person trained in administering anesthetics and, if administered in an office, only when adequate hospital facilities are available. Retiring rooms and a way for transporting the patient from the operating room to the retiring room should be provided. This may be accomplished by transporting the patient on a chair set upon rubber coasters. A nitrous oxide, oxygen and carbon dioxide machine should be available, also analeptics, an arm board that can be fixed to the arm of the operating chair, a strap to keep the patient's hand in a

Read at the Eightieth Annual Midwinter Meeting of the Chicago Dental Society, February 21, 1944.

supine position and a tourniquet and small block of wood that the patient can grasp in the hand while making a tight fist. The last mentioned equipment is especially useful when the patient has long fingernails. A 10-cc. eccentric type syringe and a 20-cc. syringe are used.

The dental chair is tilted back and the patient's arm is strapped to the board. The skin is prepared for venipuncture by application of tincture of metaphen or alcohol to the cubital region. After venipuncture, the hub of the needle is strapped to the arm with adhesive tape, and a mouth prop is inserted in anticipation of surgical procedure.

The 10-cc. syringe, with a 22-gage 1.5 inch needle, is used for the venipuncture. The large syringe is filled with a 2 per cent pentothal sodium solution and to it is attached 7 inches of rubber tubing, with an adaptor, which is attached to the needle while in the vein. The large syringe is then attached to the chemistry clamp, which is fixed to the arm board.

An intermittent technic is used, a few cubic centimeters being injected at a time until the initial dosage of 6 cc. has been administered. At this time, the operator may note whether the patient has any idiosyncrasies and whether he tolerates the drug. At times during this induction period, the mouth prop is removed and the patient is told to swallow. This relieves the patient whose mouth and throat may feel dry. After the 6 cc. of the solution is injected, the 10-cc. syringe is detached and the 20-cc. syringe is attached to the needle in the arm by adaptors and rubber tubing. Closing of the eyes and yawning are signs of anesthesia that may now appear. At this time, the tissues are tested by a sharp instrument to determine whether there is any sensory response. If there is none, the surgical procedure may be started; otherwise, a few more cubic centimeters of pentothal sodium is given.

The throat is packed before the operation is started. As the patient is subject to cough reflexes, care must be exercised to prevent mucus or blood from entering the laryngopharynx. This is best accomplished by changing the throat packs when they become saturated, and by aspirating any blood or mucus that accumulates. This procedure is very important. Utmost care must be exercised to keep the mouth free from mucus and blood.

I am frequently asked what premedication I use. In 95 per cent of cases, I do not believe that premedication is necessary. In the remainder, atropin one-one hundred fiftieth grain may be used subcutaneously or one-three hundredth grain intravenously. This premedication is not given as a respiratory stimulus, but to prevent collection of an excessive amount of mucus, which may interfere with the respiratory tract and cause cough reflexes or a mild laryngeal spasm, or interfere with maintaining an airway.

When pentothal sodium is used for cavity preparation, atropin is given to reduce the flow of saliva. Hubbell, of Long Beach, and Bullard, of San Diego, advocate the administration of morphine and atropine in certain cases. Pentobarbital sodium 1½ grains is sometimes given to allay the fears of apprehensive patients.

The anesthetist should stand at the head of the patient, where she can support the jaw, change the throat packs, administer the anesthetic and handle the aspirator.

The patient's color should remain pink at all times and the respiration should be regular. The degree of relaxation of the jaw and the shallowness of the respiration are indications of the depth of anesthesia. In cases of coughing, decreased respiration, cyanosis or laryngospasm, administration of the anesthetic should be immediately discontinued and oxygen administered. The anesthetist should observe the color of the blood and of the skin and fingernails, as certain

color changes are an indication of lack of oxygen or airway obstruction.

Lundy divides pentothal anesthesia into four stages: (1) induction, (2) light surgical, (3) deep surgical and (4) premortem. He classifies the signs of anesthesia with morphine and without morphine. As I never use morphine for premedication, I shall consider only the signs without morphine as they pertain to pentothal sodium.

The stages of anesthesia as produced by administration of intravenous pentothal are not so clear cut or well defined as with most other anesthetics. For instance, in the induction period, there is rarely an excitement stage.

In my experience, a 2 per cent solution of pentothal sodium has proved the best for anesthetic use in oral surgery.

1. The induction stage usually lasts about twenty to forty-five seconds. Muscular relaxation is very slight. The pupils react to light. The eyeballs move slowly. The skin is pink and its temperature unchanged. The pulse rate is normal or slightly increased. The blood pressure is usually unchanged. The respiration is normal. The blood is light red.

2. In the stage of light surgical anesthesia, the pupil is normal or slightly dilated. The muscular relaxation is slight. The eyeballs are fixed or move slightly. The skin is pink and its temperature is normal. The pulse rate is normal or slightly increased. The blood pressure is normal or slightly decreased. The respiration is normal. The blood is light red. I endeavor to maintain this light surgical anesthesia.

3. In the stage of deep surgical anesthesia, the pupil is normal to moderately dilated and reacts slowly to light. Muscular relaxation is good except for the abdominal wall, pharynx and larynx. The eyeball is fixed. The skin is pink or slightly cyanosed. The skin temperature is elevated. The pulse rate is normal or slightly increased. The blood pressure is lowered 10 to 20 mm. of mercury, and in hypertension 40 to 60 mm. of mercury. The respiration is shallow and slow. The blood is light red or slightly dark.

4. In the premortem stage, the pupil is dilated and does not react to light. Muscular relaxation is complete. The eyeball is fixed. The skin exhibits slight to marked cyanosis. The skin is warm. The pulse rate is rapid, weak and perhaps irregular. The blood pressure is too low to be determined. The respiration is arrested. The blood is dark.

Any systemic condition affecting the patient may change the picture during the stages of anesthesia. For example, any blood dyscrasia such as marked lowering of the hemoglobin content, diminution of the erythrocyte count or any form of anemia, would be evident as a lack of oxygen, causing increased respiration, rapid heart action and cyanosis. If this type of patient is given an anesthetic, the operation must be short and the anesthetic supplemented by nitrous oxide and oxygen. As stated before, all of our patients are ambulatory. Even though in the majority of cases anesthesia is of short duration, and muscular relaxation is not necessary, as in abdominal surgery, we must be cautious in the choice of patients for intravenous anesthesia. Patients having dyspnea should be referred to a competent internist to determine whether there is any cardiorespiratory condition. One must be sure that the respiratory passage is not obstructed in any way. Patients with cardiac disease or respiratory involvement should be hospitalized.

Most patients tolerate barbiturates. This is advantageous to the patient receiving pentothal sodium intravenously, as a barbiturate acts in prevention of shock. Once the venipuncture is made, the patient has a sense of well being which does away with any feeling of suffocation and with the fear and dread of going to sleep. It also tends to elim-

inate psychic shock. During the induction stage and the recovery period, the patient does not have any recollection of any conversation that he may have heard. When he is told to move from the operating chair to the chair used in transporting patients to the recovery room, he will do this, but will not recall having done so.

The state of temporary amnesia and analgesia of the light surgical stage makes it the optimum time for oral surgical procedures. This light surgical stage is of advantage in cavity preparation when the surgical stage of anesthesia is unnecessary.

We are often confronted with objection to the use of pentothal sodium in that, once injected intravenously, there is no control of it. We know that the drug is catabolized very rapidly in the body and it is this feature that makes it controllable.

While the alcoholic and ether concentration in the blood can be determined chemically, scientists have not been able to determine the concentration of pentothal sodium. No physiologist has yet been able to determine the disposition of pentothal sodium after it is injected intravenously. It was believed that pentothal sodium is broken up in the liver just as any other short acting barbiturate, but recent work by Kohm-Richards and others seems to disprove this theory.

I have found intravenous pentothal sodium of value in eliminating a gag reflex so that roentgenograms may be satisfactorily obtained. Patients with claustrophobia or a fear of gas anesthesia frequently welcome intravenous anesthesia.

Administration of 6 to 10 cc. of 2 per cent pentothal sodium intravenously will calm a nervous or hypertensive patient so that nitrous oxide anesthesia will be tolerated.

Intravenous anesthesia is the choice in patients with a nasal obstruction interfering with inhalation and I have found intravenous anesthesia of value in patients suffering from epilepsy, psychosis, palsy and mild diabetes.

In toxic doses of pentothal sodium, a depression of the vasomotor and respiratory centers in the medulla oblongata occurs. Any anoxemia is believed to be caused by a decrease in oxygen supply to the lungs following depression of the respiratory centers, and not to the peripheral action of the drug upon the metabolism of the body cells. It is therefore necessary to supplement the anesthetic with oxygen at the first sign of cyanosis, and not to allow the patient to get beyond the light surgical stage, unless oxygen is given along with the anesthetic.

There may be difficulty in administering intravenous anesthesia to certain types of patients, such as: (1) patients with fat arms and small thin veins and (2) children under 12 years of age with lack of cooperative nervous ability. The anesthetic of choice for children is nitrous oxide-oxygen.

Older people seem to tolerate pentothal sodium nicely. I have had no difficulty with its administration in cases of pregnancy, although I prefer to remove teeth after the third month.

Bishop and Rudder, writing in the *Journal of the American Medical Association,* state:

> A practice has been followed of restricting the use of intravenous anesthetics when one of the following situations arise:
>
> 1. The patient is under 15 years of age.
> 2. There are inflammations about the mouth and throat with potential encroachment of the upper respiratory tract.
> 3. There is reduced vital capacity.
> 4. Advanced liver or kidney disease is present.
> 5. Shock, hemorrhage or anemia is present.
> 6. There is severe diabetes mellitus.
> 7. The operation involves the skin, primarily.
> 8. The patient is ambulatory.

According to Lieutenant Colonel

Tynes, the Surgeon General's Office regards this type of anesthesia for wartime use as of such importance that a special manual has been issued describing in detail the technic of its administration, while indicating the limitations of its use.

War statistics show that pentothal sodium intravenously administered is the choice in 90 per cent of operations.

Its advantages are:

(a) Rapid induction.
(b) Quick return to consciousness.
(c) Inexpensiveness.
(d) Ease of transportation.
(e) Simple apparatus.
(f) Pleasant relief to patient.
(g) No respiratory tract irritation.
(h) In competent anesthetist's hands, a decrease in anesthetic complications and deaths.

Its disadvantages are the facts that (a) it is a respiratory depressant; and (b) the respiration must be observed carefully and any aberration corrected by an airway and administration of oxygen.

One evacuation hospital in the south Pacific used pentothal sodium for all operations on war casualties for one and one-half years and reported no anesthetic deaths. They had no oxygen or other accessory apparatus.

SUMMARY

1. Experience in more than 12,000 operative cases with pentothal sodium leads me to consider it the anesthetic of choice for oral surgery.

2. Only a competent anesthetist should administer the anesthetic.

3. Offices that are not equipped with hospital facilities, or their equivalent, should not administer this type of anesthetic.

4. As pentothal sodium is a respiratory depressant, special care must be exercised against respiratory collapse.

5. Older people tolerate the anesthetic well.

6. Pregnancy is not a contra-indication.

7. Cavities can be prepared painlessly under pentobarbital sodium anesthesia.

8. Alcoholics tolerate well this type of anesthesia.

9. A 2 per cent solution has proved best for oral surgery.

10. Indications and contra-indications for other types of anesthesia generally hold true for pentothal sodium.

11. The chief sign in intravenous pentothal sodium anesthesia is the character of the respiration, which becomes progressively shallower as the depth of anesthesia increases.

12. Inhalation of mucus and saliva must be guarded against as it interferes with respiration and may cause a laryngospasm.

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Guaranty Bank Building.

THE JOURNAL *of the* AMERICAN DENTAL ASSOCIATION

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JANUARY 1 — *Editorial Department* — 1945

TRANSITION

WITH the start of the new year, THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION marks the retirement from active editorship of L. Pierce Anthony, who now assumes the post of Editor Emeritus. It is not enough, however, to record this transition by simple announcement because Dr. Anthony has made many contributions that are worthy of the appreciation of all members of the profession. In his eight years as Editor of THE JOURNAL and in his thirty-odd years as editor of *Dental Cosmos,* he gave the profession a precise, historically informed record of scientific achievements in dentistry through the pages of his publications. His discrimination in the selection of material was dictated by a deep interest in classical literature, a competent knowledge of dental history and a lifelong study of the science of words.

In his long career as an editor, Dr. Anthony did much to increase the authority of dental journalism by setting high standards and insisting upon their acceptance. His many contributions in the form of books, articles, editorials and reviews have definitely enriched the literature of dentistry.

The new Editor joins with all members of the American Dental Association in saluting this distinguished career and in wishing for Dr. Anthony many years of well-deserved leisure for his scholarly pursuits.

From time out of mind, each generation has pointed to its own problems as having the highest order of novelty, complexity and difficulty. This claim, when made by a generation that has witnessed one world war and is now in the midst of a second, has the assurance of truth. Dentistry today unquestionably is faced with problems that are unprecedented in many generations in number and importance. In social, economic, educational, technical and scientific fields, there are many issues whose faulty solutions can have a permanent effect on the pattern of dental practice and progress.

In facing these disquieting days, the new Editor hopes to continue all of the traditional functions of THE JOURNAL and to undertake those new ones that are dictated by this urgency of the present and of the future. To that task, he brings the sincere conviction that success and achievement lie in free and undogmatic discussion, in scientific analysis and studied conclusion, in recognizing the past while designing the future, in securing the cooperation and interest of every member.

HAROLD HILLENBRAND.

THE EDITOR RETIRES
AN APPRECIATION

WHEN the Editor of THE JOURNAL retires from his post on December 31, 1944, he will have completed a notable record in the fields of dental literature and journalism. For forty years, his professional interests have been centered in dental reporting, writing and editing. This record is no doubt unique in the entire history of dentistry. Born in a rural section of Georgia August 20, 1876, L. Pierce Anthony attended the public schools in his native state up to the completion of the grammar grades and then attended Banks Institute at Forsyth, Ga., a private school of secondary grade. From the institute, he went to Emory College, then located at Oxford, Ga., where he spent two years. Emory College was the forerunner of Emory University now located in Atlanta. After his work at Emory College, he spent six months in the special study of stenography, bookkeeping and business practice in the Eastman School of Business at Poughkeepsie, N. Y.

Going back to his beloved Georgia, young Anthony worked for two years in the office of a stock broker at Atlanta and then entered upon dental study at the Southern Dental College. This college was later affiliated with the Atlanta Dental College under the title of the Atlanta-Southern Dental College, which has recently become an integral unit of Emory University. Graduating after three years of dental study, Dr. Anthony practiced dentistry in Atlanta for about three years.

Removing to Philadelphia in 1904, he began his life work as a reporter for the *Dental Cosmos*. He became associate editor of that journal in 1917 and editor in 1930, and had a large part in the development of the *Dental Cosmos* to the high place it enjoyed in dental periodical literature. When the *Dental Cosmos* was taken over by the American Dental Association in 1936, Dr. Anthony came to Chicago to become Associate Editor of THE JOURNAL. He was made Editor in 1938. His record in the editorship of THE JOURNAL is well known to the entire professsion.

In the course of his editorial career, Dr. Anthony made several outstanding contributions to dental literature. Among these may be especially mentioned "A Dictionary of Dental Science," "Dental Terminology" and the 75th anniversary number of the *Dental Cosmos*. More significant, perhaps, than any other effort has been his distinguished editorship of the "American Textbook of Prosthetic Dentistry."

In his editorial capacity in the *Dental Cosmos* and later in THE JOURNAL, Dr. Anthony has made his most effective long-range imprint upon the development of dental education and dental practice. He was a pioneer in urging that "dental care for the child in its early years holds forth the promise of untold benefits for the coming generations, even though such care may appear to be too late from the preventive standpoint for the present generation."

Graduating from a dental school in the era when proprietary dental schools were still in the ascendency, Dr. Anthony consistently advocated the development of dental education to the level of a university discipline and was rejoiced when his alma mater became a definite unit of a university.

"Dental education in its broadening scope," he once said, " is continually extending its horizon and, as its horizon extends, a broader and more extensive knowledge of its own and related sciences is demanded. It is this broadening scope and the constantly enlarging health relations of dentistry that preclude the possibility of dental education and the dental curriculum ever becoming static."

Throughout his forty years of alert interest in the passing scene, Dr. Anthony has insisted that dentistry as a distinct branch of the healing art has won the right to autonomy, both in education and in practice. This consistent view he voiced when he said,

"From the very inception of dentistry as a specialty of the healing art separate from medicine, one of the uppermost objectives in the mind of dentistry has been to compel the medical profession to recognize dental practice as a branch of medicine worthy of its cooperation and collaboration, to the end that the health of one of the most important organs of the body might not be neglected as a factor in general bodily health. Lack of such recognition and consideration was the very reason for the establishment of the dental profession and for all the educational system built up around it."

Believing in the extension of dental care, Dr. Anthony was never disposed to consider that so-called socialized dentistry offered a panacea. Thus, he said:

"It is highly desirable that dental health service be made accessible to the public at large and, as we see it, it is a problem which the dental profession itself should solve, and the manner in which it is solved will have a very definite influence upon the future of dentistry as a branch of the healing art. We are in no sense in favor of the socialization of dental service, but we are convinced that if dentistry does not do something about it, the public will, and we believe that the final result will be more agreeable and satisfactory to all concerned if they do it *with* us rather than *to* us."

These quotations from Dr. Anthony's editorials are merely illustrative of the character and caliber of his thinking. A quiet, deliberate man, he nevertheless has shown vision and imagination in his long record of appraisal of dentistry and its problems. A great profession, such as Dentistry, is of itself voiceless. For many years, Dr. Anthony has put into words the common thinking of the dental profession. He has not only had the capacity and the discernment to express the common viewpoint: he has promoted and guided sound conceptions and straight thinking. Dentistry has been dignified and advanced because of his labors, and dentists everywhere, proud of their profession and devoted to it, are in his debt. A great host of those who know him personally as well as the many others who know him only by reputation will join in wholehearted good wishes to him as he lays aside his editorial pen.

HARLAN HOYT HORNER.

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PRINCIPLES OF ETHICS OF THE AMERICAN DENTAL ASSOCIATION

To the Editor:

You will probably recall that the Reference Committee on the reports of the Judicial Council, recommended that the Editor of THE JOURNAL "give consideration" to the idea of printing the newly adopted "Principles of Ethics of the American Dental Association" in either the MID-MONTHLY, or THE JOURNAL. I am attaching a copy of the "Principles," etc., as formally adopted, for your convenience.

ERNEST G. SLOMAN, *Dean,*
College of Physicians
and Surgeons of San Francisco.

October 24, 1944.

PRINCIPLES OF ETHICS OF THE AMERICAN DENTAL ASSOCIATION

SECTION 1: IN GENERAL

The following Code of Ethics is prescribed in order that dentists may more clearly understand their responsibilities and obligations to patients, to the community at large, to fellow practitioners and to the profession.

SECTION 2: ADVERTISING

It is desirable for dentists to endeavor to merit a reputation for good judgment, professional skill and fidelity with fellow practitioners, and the public. This desirable end cannot be forced, for it is the result of time and of excellence of conduct and abilities. Advertising is inconsistent with acceptable professional behavior; and, if used, it not only reflects upon the quality of the individual who employs such measures, but also has the far more consequential effect of lowering the entire profession in public esteem.

It is therefore unprofessional to solicit patients. Advertising in any form, whether by individuals, groups or institutions, is in itself evidence of such solicitation.

SECTION 3: CARDS, LETTERHEADS AND ANNOUNCEMENTS

It is not considered improper to use ordinary simple business cards and letterheads, but information printed thereon should be in good taste and in keeping with the custom of dentists of the community.

The use of the words "specialist" and "specialty" should be avoided. If, however, a dentist limits his practice to one of the traditional specialties of dentistry, it should not be deemed improper to include that information on his professional cards and letterheads. There should be little or no occasion for sending announcements to one's patients. Judicious exceptions may be made in instances in which one changes his place of practice, or discontinues general practice to engage in a specialty or returns to practice after protracted absence. Such announcements should be simple in form and in good taste and, if sent to other than fellow practitioners, should be mailed to patients of record only.

SECTION 4: DIRECTORIES

The manner in which dentists permit their names to appear in community directories, while of proper concern to the whole profession, should be guided by the expressed wishes of the dentists of the community. It would obviously be improper to permit one's name to be listed in a community directory that does not include all, or practically all, the names of dentists of that community. The use of a printer's type, or a color or any other device that permits one's name to stand out from others is to be avoided. If one limits his practice to one of the traditional specialties, and the dentists of the community, through their appropriate district societies are agreeable to the inclusion of that information in the directory, such arrangement should not be deemed a violation.

SECTION 5: OFFICE DOOR LETTERING AND SIGNS

The use of lettering and signs that forcefully attract attention is not good professional practice, for it reduces respect for the user, and lowers public respect for the profession. It is recognized that require-

ments as to door lettering and the use of window lettering and signs, when permissible, must vary in rural communities and neighborhood districts as compared with office buildings.

Questions arising should be the subject of code interpretation and rulings of appropriate committees of the district societies in keeping with practical considerations and continued efforts to maintain the profession on a high plane of public respect. Information afforded should be confined to the name or names of the dentist or dentists, the word "dentist" or "dentists" or "dentistry" and, if desirable, the office hours. In those instances in which the practice is limited, such information may be appropriately afforded.

SECTION 6: SPLIT FEES, COMMISSIONS AND REBATES

It is a violation of sound ethical principles for a dentist to accept part of a fee paid to another dentist or a physician and surgeon for any reason, and if a fee is "split" by two members of the professions, both should be deemed violators. Likewise, acceptance of rebates or commissions offered as an inducement to refer patients to others, including radiographers, pathologic laboratories, drugstores, etc., are violations of good conduct.

SECTION 7: PATENTS AND COPYRIGHTS

Every one who practices a healing art is heir to a weath of accumulated knowledge, technics, instruments, and methods of treatment, all of which were contributed from time to time by others to the cause of better health and the profession's warfare against the ravages of disease. It follows that the fruits of our discoveries, labor and skill, in the field of health service, should be likewise contributed to this common pool of knowledge and procedures without exaction of premiums by the discoverer. The procurement of a patent right or a copyright, either in whole or in part, for reasons other than the protection of the public and profession, is not good professional practice.

SECTION 8: TOOTH CLEANSERS, THERAPEUTIC AGENTS AND EXCLUSIVE METHODS

It is unprofessional for a dentist to prescribe or dispense secret medicines or other secret remedial agents or to manufacture or promote their use in any way.

It is unprofessional to permit one's name to be used to designate toothbrushes, mouth washes, tooth powders, tooth pastes, liquid cleansers, etc.

It is also unprofessional for a dentist to indicate in any way that any remedy, technic, method of treatment or instrument is exclusive to himself, or to a group of which he is a member.

SECTION 9: UNJUST CRITICISMS, EMERGENCY SERVICE, CONSULTATION

Consultations between dentists leading to prognosis and treatment as well as consultations between dentists and medical practitioners and specialists afford reassurance of sound procedure and better opportunity for favorable results, and are indeed desirable in those instances in which a patient is suffering from consequential illness,, or when there may be doubt as to indications for surgery, restorations or method of treatment.

One dentist should not refer disparagingly to the services of another in the presence of patients. Criticism of defective restorations, faulty operations or improper diagnosis or treatment may be unjust because of lack of knowledge of the conditions under which the services or directions were afforded. However, the welfare of the patient is paramount to every other consideration, and should be conserved to the utmost of the practitioner's ability. It he finds indisputable evidence that a patient is suffering from previous faulty treatment, it is his duty to institute correct treatment at once, doing it with as little comment as possible, and in such a manner as to avoid reflection on his predecessor and the profession. If a dentist is consulted in an emergency by the patient of another practitioner who is temporarily absent from his office, or by a patient who is away from home, the duty of a dentist so consulted is to relieve the patient of any immediate disability and then refer the patient back to his regular dentist. To urge or institute a different plan of treatment is unethical, except, however, in those instances in which it is manifest that a change has occurred, obviously not anticipated by the patient's regular dentist.

When a dentist is called in consultation by a fellow practitioner, he should hold the dis-

cussion in the consultation as confidential, and under no circumstances should he accept the case without the consent of the dentist who has been attending it or until he has been assured that any differences concerning the patient's obligation to the previous dentist have been satisfactorily adjusted.

SECTION 10: GROUPS, CLINICS AND CONTRACTS

The requirements of good professional practice for groups and clinics are precisely as for individuals. Members of groups or those participating in clinic service are not relieved of any ethical responsibility that pertains to individuals. The use of the name "clinic" or "institute" or any other similar title that may suggest a public or semi-public activity to designate what is in fact an individual or a group private practice is misleading, and therefore unethical.

It is unprofessional for a dentist to enter into a contract which imposes or invites conditions that make it difficult or impossible to deal fairly with the public or one's fellow practitioners.

NOTE: Whenever there arises between members of the American Dental Association a grave difference of opinion regarding professional conduct or questions of an ethical nature which cannot be adjusted without assistance, the dispute should be referred for consideration and settlement as follows:

1. To a committee of impartial dentists, preferably the Committee on Ethics or a similar committee of the local component society.

2. Should the verdict be unsatisfactory to either party, appeal may be taken to a similar committee of the state or constituent society of which the component society is a part.

3. Should the verdict still be unsatisfactory to either party, appeal may be made for settlement to the Judicial Council and ultimately to the House of the Delegates of the American Dental Association.

4. When differences arise between members of their respective local societies or official units thereof, and such differences cannot be adjusted within the society, the matter should be referred first to the state society and thereafter, if need be, to the Judicial Council and ultimately to the House of Delegates of the American Dental Association.

5. State and district societies are urged to establish codes of ethics not inconsistent with that of the parent association and, in addition, to determine interpretations, particularly with respect to those parts of the parent association's code purposely left to component societies, designed to afford more precise regulations.

The Judicial Council was created to assist officers and committees of state and district societies in discharging responsibilities incidental to code creation, management and interpretation.

CONCLUSION

The foregoing statements are intended to express, in a general way, the responsibilities of dentists to the public, to their patients, to the profession, and to practitioners of dentistry. It is not anticipated that these cover the whole field of ethics for members of the profession. There are many obligations assumed by those who choose dentistry as their life's work, in addition to those included in the foregoing statements. To know the answers to most questions not presented in this code, we need but to be guided by the Christian rule to do unto others as we would have others do unto us.

BUREAU OF PUBLIC RELATIONS

THE WHY AND HOW OF TOOTHBRUSHING*

THE PURPOSE OF ORAL HYGIENE

MOUTH hygiene is not a recent product of civilization. It has been practiced for ages, not only for esthetic purposes and a feeling of mouth comfort, but also for the prevention of disease. Yet there are many people today who do not clean their mouths at all. Others, for appearance's sake, brush only the teeth that are visible. It would seem that the large majority of persons brush the teeth merely because "it is the thing to do," like washing the face or taking a bath. The procedure followed is unplanned and completely hit-or-miss.

Only a small number understand the real value and importance of mouth hygiene as a health measure. It is true that a very few persons, evidently immune to dental disease for some reason or other, enjoy mouth "health" without ever using a toothbrush. Nevertheless, the fact remains that most of us who are subjected to civilization's way of living, which includes hurried mastication and the use of soft foods and foods deprived of their protective ingredients by cooking or refining processes, must compensate in part with a strict régime of mouth hygiene.

Although, admittedly, mouth hygiene is far from being the whole and complete answer to the problem of preserving mouth health, it has a very important bearing on it, as may be inferred from two well-established facts: 1. The parts of teeth that are kept clean seldom decay. 2. The parts of the gum that are effectively reached by the massaging action of the toothbrush rarely become diseased even in persons generally susceptible to rampant tooth decay or gum disease.

In other words, the control of such diseases, and thereby the prevention of all that they entail, rests largely with each of us. We can reduce the hazards markedly by a conscious and intelligent effort to carry out oral hygiene procedures thoroughly and routinely so that all the parts of all the teeth are adequately cleaned and the gums sufficiently massaged. Once the oral hygiene technic is learned and the habit established, little time (about three minutes) and effort are required. Of course, other protective means, such as appropriate diet and masticating habits, have much additional value in the prevention of tooth and gum disease. Such efforts obviously yield the additional important advantage of reducing dental bills to a minimum.

WHEN TO BRUSH

To get the greatest benefit from tooth brushing, the teeth should be brushed as soon as possible after eating. This prevents the food from adhering to the teeth long enough to form acids, which start tooth decay and cause irritation and inflammation of the gum. For good results, one should at least brush the teeth after breakfast and at bedtime. Needless to say, if an effort is made to brush and/or use dental floss after each meal as nearly

*The growth of public interest in dental health has resulted in a marked increase in requests for information on different phases of the subject. To meet this demand, the Public Relations Committee of the Council on Dental Health has authorized the preparation of a series of articles in pamphlet form, each article to deal with one of the dental questions most frequently asked by the public. The current article, "The Why and How of Toothbrushing," by Isador Hirschfeld, D.D.S., can be obtained in reprint form at a nominal cost by addressing the Bureau of Public Relations, American Dental Association, 222 E. Superior St., Chicago 11, Ill.

as possible, much will be gained in the way of prevention of tooth and gum disease.

HOW LONG TO BRUSH

With too little brushing, much of the benefit of thorough oral hygiene is lost. On the other hand, if brushing is too prolonged, the enamel of the teeth may be worn away or the gum pushed away, or both. Yet it is unsatisfactory to time oneself on the basis of minutes since that fosters unequal distribution of brushing. For instance, with three minutes' brushing, two minutes might be devoted

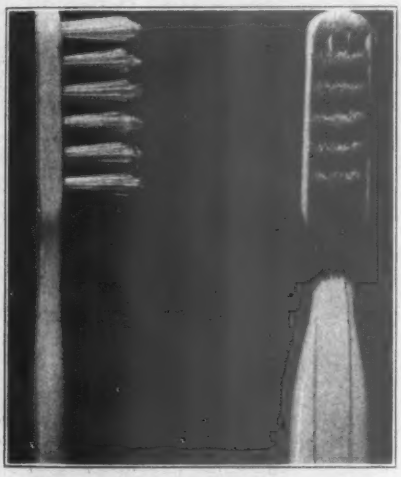

Fig. 1.—Toothbrush (original size) satisfactory in both size and design.

to a very limited, favored area, and the remaining minute to all the other parts, which would thus be only skimmed over.

A practical way to insure an equal amount of brushing on every tooth is to repeat each stroke a definite number of times (preferably six or eight) in each area, brushing one area at a time, in proper sequence. In the average mouth, this usually requires no more than three minutes altogether, once the brushing technic is mastered.

THE KIND OF BRUSH TO USE

If the brush used is of unsatisfactory construction or design, the brushing is liable to become less efficient and even injurious, no matter what method is used or how careful the brusher is. Unfortunately, all too often, John Q. Public is misguided in the selection of his brush by high powered advertise-

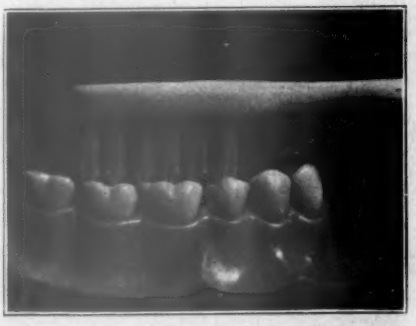

Fig. 2.—Brushing chewing surfaces of teeth.

Fig. 3.—Diagram showing up and down stroke used in brushing outer, or cheek, surfaces of teeth and gums.

ments illustrating false "selling" points that have no merit in fact.

Present-day authorities recommend the following qualities for a brush (Fig. 1):

1. The brush head should be no longer than 1 inch, and the handle, as well

as the brush head, should be straight, not curved.

2. The bristles should be of even length (approximately one-half inch) and the tufts sufficiently interspaced (about one-eighth inch apart) to permit easy cleansing. A two-row brush is recommended for children, but, for persons over 15, a three-row brush is more satisfactory.

Fig. 4.—Dental arch divided into six sections.

3. The bristles should be of medium, never extreme, hardness. Several brands of such a brush are on the market.

WHEN TO DISCARD A BRUSH

The life of a toothbrush cannot be measured on a time basis. Some serve longer than others, the length of serviceability depending on the original differences in quality, the manner of manipulation and the frequency of use. A brush should be discarded when the bristles become too soft or when they begin to shed. Softened, non-resilient bristles fail of their purpose because they have lost their effective cleansing and massaging qualities.

In order to give the bristles a chance to dry thoroughly after each use, it is advisable not to use a single brush more than once daily. The number of brushes required, therefore, should correspond to the number of daily brushings. The brush should not be placed in an air-tight container, where it cannot dry completely.

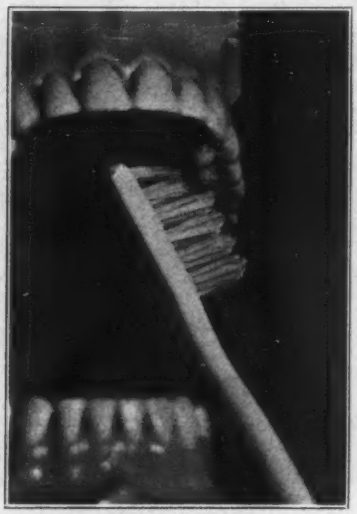

Fig. 5.—Brushing inner, or tongue, surfaces of upper teeth.

OBJECTIVE IN MOUTH HYGIENE

From a health point of view, there are two main objectives in oral hygiene. The first is to keep the teeth clean of adhering food. This helps (1) to prevent the formation of acids, which may dissolve the enamel, and (2) to limit the growth of germs that start tooth

decay. The second is to massage the gums sufficiently to improve local blood circulation. This, in turn, helps to maintain resistance to the establishment of gum disease, such as gingivitis, pyorrhea and trench mouth.

Usually, these objectives can be achieved through the intelligent use of the toothbrush, which can clean the teeth and at the same time massage the gums; through the judicious use of dental floss to clean the contact points of adjoining teeth where bristles cannot function so well, and, in certain instances, through the timely use of toothpicks, to dislodge early (before the feeling of pressure discomfort wears off) fibrous food wedged between certain teeth. Improperly used, these three implements may not only fall short of their purpose, but may also cause harm to the teeth and gums. If the use of dental floss or toothpicks is indicated, the dentist should instruct the patient in the best technic, in order to prevent injury to the mouth tissues. It is also beneficial to have the dentist demonstrate the toothbrushing method best suited to the individual mouth. From time to time, the dentist should check up to see whether the patient is continuing to use these devices properly.

Fig. 6.—Brushing inner surfaces of lower front teeth.

SEQUENCE IN BRUSHING PROCEDURE

The sequence in which the various stages are carried out is almost as important as the brushing technic itself. This is because the bristles become progressively softer during the cleansing process. Accordingly, the parts that are best served and least harmed by the use of stiffer bristles are brushed first, and the parts that are liable to injury are brushed last.

Fig. 7.—Brushing inner surfaces of lower back teeth.

A practical sequence in the brushing procedure, no matter what method is used, is as follows:

1. The first step is always to brush the chewing surfaces of the back teeth (molars and bicuspids). The reason is evident: These surfaces have natural grooves, crevices, pits and other irregularities into which food becomes tightly packed during mastication owing to the tremendous pressure (about 150 pounds) between the jaws. Obviously, this wedged-in food can be dislodged more readily at the beginning of brushing,

when the bristles are stiff, than after they have become softened.

2. The second step is to brush the outer side of the teeth and gums. The bristles, somewhat softened after their use on the chewing surfaces, are now less apt to injure the gum tissue.

3. The third and last step is to brush the inner side of the teeth and gum. The gum in this area is liable to injury by stiff bristles owing to the fact that we cannot see exactly what we are doing and that the action of the brush here is not always easily controlled. Therefore, we are less likely to inflict injury at the end of brushing, when the bristles become additionally softened through use on the outer side.

BRUSHING TECHNIC

A practical toothbrushing method, and one that has proved satisfactory for most mouths, is as follows: First, brush the chewing surfaces of all the back teeth. Keeping the handle firmly grasped in front of the nose, place the brushhead on the chewing surfaces of the upper or lower back teeth starting on either side of the mouth, with all the bristles resting on the teeth, as in Figure 2. Then, lifting the brush, hit down on the teeth, six or seven times, with a punching action. This is repeated on the chewing surfaces of the opposite teeth and then on those on the other side of the mouth. The packed-in food is thus dislodged and, at the same time, the bristles are somewhat softened.

Instead of the punching stroke, a small circular one may be used, but never a sweeping stroke.

The second step includes brushing the outer side of all upper and lower teeth. The most effective stroke here is a short, rotary one, but since it is also the most difficult to learn, it requires individual instruction and demonstration. Therefore, the straight up-and-down stroke, which can be readily learned from a written description, is here presented instead. It, too, is quite effective provided the teeth stand in normal position and the gums are normal.

With the front teeth held edge-to-edge (Fig. 3), place the brush on the outer side of the teeth (molars) farthest back, beginning on the right or left side, as you wish. Starting on the upper gum, brush down over the upper teeth and the lower teeth and gum, then back to, and including, the upper gum. This stroke too is repeated six or seven times. Dividing the dental arch into six sections (Fig. 4), move progressively forward and repeat the same strokes in each position, until the very last back teeth on the other side of the arch are reached and cleaned. It is better not to start on the same side of the mouth routinely, but to alternate. If you have spaces between the teeth due to loss of gum there, they should be cleaned before you proceed to the inner side of the teeth. This is done by working the bristles gently into the spaces and by rotating the brush very slightly, thereby cleaning the in-between sides of the teeth and at the same time massaging the gum points.

To brush the inner side of the upper teeth (the third step), the brush is placed in as nearly a vertical position as possible (Fig. 5). Only the bristles on the top half of the brush are used, with a push and pull action, comparable to that of fiddling, not just a pull stroke. The brushing is begun on the last upper tooth on either side of the mouth, as preferred, making about four up-and-down strokes in each position, and moving the brush progressively forward until the final tooth on the other side is reached; then back again over the same teeth in the same manner. This repetition is expedient because it is difficult to divide the inner side of the dental arch into definite sections, and if a part is missed in the first round of the brush, the probability is that it will not be omitted in the second. Also in cleaning the inner side of the lower front teeth,

the brush is held vertical (Fig. 6); but, in the back part of the mouth, this is impractical because the teeth there lean toward the tongue, and they can best be reached with the brush handle held in front of the mouth. (Fig. 7.)

DENTIFRICES

In widespread advertisements, various claims are made for the different dentifrices: that they prevent or control bleeding gums; that they make the teeth sparkling white; that they have alkaline, antacid or astringent effects; that they act as deodorants, etc. Disregard them all. If you rely on the dentifrice for any of these supposed benefits, you may endanger the health of your mouth by unduly delaying diagnosis and treatment of such symptoms, through a false sense of security.

The only usefulness of a toothpaste or powder lies in its cleansing action, supplementary to that of the toothbrush. Any one brand may serve as well as any other in this respect, provided it is not gritty and does not contain an acid.

The National Bureau of Standards suggests testing a dentifrice for abrasiveness (coarseness) by rubbing some of it on a glass slide with a 5-cent piece to see whether scratches are produced. If not, the dentifrice probably is not too coarse for human enamel.

The important thing to remember is that the brush must be properly used because, if it does not reach a particular area, neither does the dentifrice, and cleansing there is practically nil, no matter what dentifrice is used. Since powder and paste have about the same cleansing value, one's preference is a matter of taste or convenience.

NOTE: This brochure on mouth hygiene is not intended as a substitute for a practical demonstration in the dental chair, which is the best means of learning to brush the teeth efficiently and with the least possible injury. Rather, it is designed to supplement the dentist's instruction, as well as to remind the patient of some of the basic details that he may have forgotten or perhaps did not quite grasp when the dentist explained them.

NATIONAL BOARD OF DENTAL EXAMINERS

The following candidates successfully passed Part 2 of the National Board examinations, July 31-August 1, 1944:

Atlanta Southern
Albert Charles Koppel

University of Pennsylvania
Robert C. Drelich

St. Louis University
Joe D. Pinion
Thornton A. Beach
Aaron Hornstein

University of Nebraska
Virginia Lee King

Baltimore College
Robert C. Knowlton
Elliott H. Perlman

GORDON L. TEALL, *Secretary.*

COUNCIL ON DENTAL THERAPEUTICS

CEPACOL—MERRELL—NOT ACCEPTABLE FOR A.D.R.

THE report on Cepacol was sent to Wm. S. Merrell Company before it was submitted to the Editor for publication. The firm commented to the effect that, owing to shortage of materials, the proportion of alcohol in the lot tested was 15 per cent. This is a deviation from the label statement of 18 per cent. The firm stated that the lot tested contained 7.5 per cent of glycerine, and that they were temporarily using sugar to supplement the glycerine, which was formerly present to the extent of 10 per cent. The firm stated that sugar was being omitted and the glycerine content was being increased to 10 per cent. The following report, which has been authorized for publication by the Council, is submitted for the information of the dental profession.

DONALD A. WALLACE, *Secretary.*

Advertisements for Cepacol have appeared in certain dental journals during the past year. According to the label, the product consists of cetylpyridinium chloride (ceepryn brand) 1:4,000, alcohol 18 per cent and sodium phosphate in a flavored solution. The product is referred to on the label as an "Alkaline Germicidal Solution." It is sold as an antiseptic and mouth wash.

The Council office invited the Wm. S. Merrell Company, distributors of the product, to submit it in the usual manner for consideration by the Council. The firm did not submit the product, but did send two folders, a blotter, copies of recent advertisements and copies of four form letters to the dental profession. Reprints and references to the literature on ceepryn, one of the active ingredients of Cepacol, were also supplied.

The firm did not provide a sample package or a statement of composition for Cepacol. It was necessary, therefore, to purchase a sample of the product on the open market and analyze it in the A.D.A. Bureau of Chemistry.

The following results were reported by the chemist:

pH at 20° C.	7.6
Phosphate in terms of Na_2HPO_4	0.22% w/w
Sucrose	4.2% w/v

The product was found to be highly flavored.

The chemist's findings, coupled with the meager quantitative information given on the label, indicate that the product is a highly flavored aqueous solution containing 18 per cent of alcohol, 4.2 per cent of sugar (sucrose), 0.22 per cent of disodium phosphate and 0.025 per cent of cetylpyridinium chloride. The label claim for alkalinity is supported to some extent by the chemist's findings that the pH value is 7.6, which is slightly above the neutral point.

No scientific evidence of the value of Cepacol was presented by the firm. In view of this lack of evidence, the claims for it which appear in the advertising are striking. For instance, it is stated on one piece of advertising: "Cepacol is rapidly effective against pathogenic bacteria, and at the same time, acts as a non-toxic, mildly alkaline cleansing agent with remarkable mucus-clearing detergent action. Allays irritation. Soothes inflamed tissues." It does not seem very likely that a product which contains 18 per cent of alcohol would allay irritation or soothe inflamed tissue.

The firm stated in an advertisement that appeared in February 1943, "By standard F.D.A. tests, Cepacol destroys

pathogenic bacteria common to the mouth and throat *within 15 seconds after contact.*" A member of the Council tested a sample of Cepacol purchased on the open market and reports, "When tested by the F.D.A. (Circular 198) WET FILTER-PAPER METHOD, Cepacol (undiluted) failed to kill *Staphylococcus aureus* and *Eberthella typhosa* exposed for one minute."

One of the folders supplied by the firm bears the title "Cepacol Brand Alkaline Germicidal Solution in the Treatment of INFLAMMATIONS OF THE THROAT." The first half of the first page of the booklet makes the claim that "Cepacol is rapidly effective against pathogenic bacteria associated with sore throat, and, at the same time, fulfills requirements for a bland cleansing solution that allays irritation and soothes inflamed tissues." Almost all of the evidence cited in the booklet is on ceepryn, rather than on Cepacol, and conclusions drawn on the basis of this evidence are transferred directly to Cepacol, which is a very different preparation. This practice is grossly unscientific and misleading.

A similar practice is followed in another booklet, entitled "Cepacol Brand of Alkaline Germicidal Solution IN DENTAL OPERATIVE PRACTICE." Among the claims made in this booklet are: "Potent in high dilution against a wide range of bacteria," "Potent in Presence of Serum," "Non-irritating to delicate tissues," "No interference with Healing," and "non-toxic." None of these claims are supported by acceptable evidence. In this booklet, Cepacol is suggested for use before, during and after instrumentation, as an adjunct in the treatment of Vincent's infection, as a solution in which to immerse artificial dentures, as a bacteriostatic agent to keep sterilized instruments sterile and as a gargle. It is not shown that Cepacol is effective for any of these purposes.

The limitations of medicated mouth washes in the treatment of oral disease are well known. There is no evidence that Cepacol is superior in effectiveness to other common unacceptable mouth wash preparations.

To summarize, Cepacol is a complex liquid, highly flavored and sweetened with sugar, for which broad and unwarranted claims of therapeutic value are made by the Wm. S. Merrell Co. The bulk of the evidence cited by the firm to substantiate its claims for the product was obtained only on one of the active ingredients of Cepacol. The application of such evidence to Cepacol is unwarranted. The material supplied by the firm does not show that Cepacol has any value in the practice of dentistry, and Cepacol is therefore declared not acceptable for A.D.R.

COUNCIL ON DENTAL HEALTH

REVISION OF THE EIGHT PRINCIPLES

DURING the past two years, the Council on Dental Health has studied the many complex factors in the dental health problem; it has examined various methods for attacking the problem, and it has analyzed the expressed philosophies of the American Dental Association that pertain to dental health programs.

The Council was greatly benefited in its work utilizing as background material the investigations and conclusions of the National Health Program Committee of the American Dental Association. It will be recalled that, five years ago, this committee established a plan for a three-point attack on the problem of dental disease: dental research, dental health education and dental care for children. The committee also formulated the well-known "Eight Principles" by which the American Dental Association could be guided in participating in a national health program. The three-point program and the "Eight Principles" were adopted by the House of Delegates in 1939.

In its annual report to the House of Delegates that appears in the *Proceedings* dated October 16-18, 1944, the Council on Dental Health said:

A review of the Council's studies and investigations during the past two years will reveal that it has given careful consideration to the fundamental dental health problems. In attempting to find a solution to these problems that could be based on the tenets of the American Dental Association, the Council became conscious of the fact that a revision of the "Eight Principles" would be of considerable aid in developing plans consistent with the attitudes and concepts as they exist today. The original "Eight Principles" were adopted by the House of Delegates in 1939. The Council is of the opinion that the present attitude of the American Dental Association can be more clearly stated by revising the statement of principles.

Consequently, the Council recommended to and obtained approval from the House of Delegates during the October 1944 meeting that the "Eight Principles" should be revised as follows:

Dental Health for the American People: A Statement of Principles by the American Dental Association

1. *Research:* Adequate provisions should be made for research which may lead to the prevention or control of dental diseases.

2. *Dental Health Education:* Dental health education should be included in all basic educational and treatment programs for children and adults.

3. *Dental Care:* (a) Dental care should be available to all regardless of income or geographic location.

(b) Programs developed for dental care should be based on the prevention and control of dental diseases. All available resources should first be used to provide adequate dental treatment for children and to eliminate pain and infection for adults.

(c) Dental health is the responsibility of the individual, the family and the community, in that order. When this responsibility, however, is not assumed by the community, it should be assumed by the state and then by the federal government. The community in all cases shall determine the methods for providing service in its area.

4. In all conferences that may lead to the formation of a plan for dental research, dental health education and dental care, there should be participation by authorized representatives of the American Dental Association.

EARMARKED FUNDS

Another recommendation of the Council, also approved by the House of Delegates, is closely related to the new principles and establishes a mechanism

for financing the three-point program. The recommendation, which was submitted in a supplementary report to the House of Delegates during the October 1944 sessions, reads as follows:

In 1939, the House of Delegates of the American Dental Association approved a plan by which Dentistry could participate in a national health program. The plan is based on dental research, dental health education and dental care, particularly for children. In order that such a program may be developed, it is recommended that the Committee on Legislation of the American Dental Association be authorized to sponsor the introduction of a bill in Congress appropriating earmarked funds, such funds to be used to assist in financing the three-point program as approved by the American Dental Association. It is further recommended that the Committee on Legislation attain this objective by securing a separate appropriation bill in Congress or by adding an amendment to the Social Security Act as the Committee on Legislation may deem necessary.

Decisions will still need to be made relative to the amount of the fund to be requested, the procedure for allocating appropriations to the various states and a mechanism for using the funds in programs for research, dental health education and dental care.

ALLEN O. GRUEBBEL,
Executive Secretary

PATENT COMMITTEE

THE PATENT COMMITTEE'S NEW JOB: PLANNING AN HONORARY AWARD FOR THOSE WHOM THE PROFESSION DESIRES TO HONOR

WHEN the inlay patent suits were finally defeated in the courts in the early twenties, several of the more thoughtful leaders in Dentistry decided that it would be unwise to continue leaving the profession to possible exploitation by special groups, organized under the pressure of the moment.

True, both the U. S. Dental Protective and the Alliance associations performed well and competently. Still that was no guarantee for the future. The next time, the profession might not be so fortunate. If, on some other occasion, men less able and not so devoted should assume the responsibilities of the defense, the result might be disastrous.

Accordingly, these leaders advocated the establishment of a committee on process patents, within the framework of the American Dental Association; but, strange as it may seem today, this very excellent idea met with considerable opposition, particularly from those who had supported Taggart and who still believed that those making original contributions to Dentistry should receive compensation as in other fields.

In the end, professional tradition triumphed and the By-Laws of the Association were amended to provide for a committee whose duties would be to prevent exploitation of dentists by means of process patents.

Now, more than fifteen years after the amendments were passed, the Committee on Patents has fought only one suit, the Webb patent on the use of a bipolar electrode to cauterize gum tissue, which was won in both the lower and the appellate courts. Several minor threats to institute proceedings for infringement were silenced when the patentees realized that Dentistry was prepared to defend itself. Apparently, the mere existence of the committee was enough to discourage litigation.

Obviously, neither the committee nor

the officers or Board of Trustees were much disturbed since the profession had enjoyed freedom from legal persecution and had no need to spend its funds for attorneys' fees or court costs. Nevertheless, this inactivity was not without its disadvantages. People do not like to serve on inactive committees and the quality of the personnel tends to suffer accordingly. Furthermore, groups, like physical organs which do not function, lose their vitality, and in the event of a case resembling that of the crown and bridge or inlay patents, there would be the possible danger that a committee which had been dormant might not be equal to the task presented.

Honorary American Dental Association award to Horace Wells, posthumously.

This at least was the situation as it appeared to the chairman and the members of the Patent Committee, and

they came to the conclusion that to maintain the effectiveness of the Patent Committee, some activity besides that pertaining to patent and patent litigation should be undertaken, such activity of necessity to be related to or in some way connected with its prescribed function. The chairman finally conceived the idea of requesting the Board of Trustees that the committee be given a commission to plan and develop an honorary award similar to that used by other scientific societies, notably the American Medical Association, which, for several years, has awarded an honorary medal annually for a meritorious contribution in the medical field.

While, at first glance, the connection between patent protection and an honorary award seemed rather remote, they actually complement each other. Upon further consideration, it becomes plainly evident that since it is the function of this committee to prevent any one from profiting from original processes or methods (the By-Laws read "No process patent shall be compromised"), it was only logical that it should also carry the responsibility for providing another type of compensation for achievement, a nonmonetary kind in line with the professional concept.

The four other members having voted their approval, the chairman appeared before the Board of Trustees during their February meeting in Chicago two years ago and presented the outline of a plan for an honorary award. The Board approved of the idea and instructed the committee to continue its effort and to bring in a full report at its earliest convenience.

At the midwinter meeting in Chicago in 1943, the plan for an honorary award as presented by the Patent Committee was accepted by the Board. To put the plan into operation, the Board adopted several amendments to the By-Laws under the heading of "Process Patent Committee" and a resolution governing the selection of candidates, method of presentation, etc.

Instead of a medal, it was decided that the award should consist of a plaque, a wood panel with silver mountings as follows: the Association seal, laurel wreath, name of recipient and inscription. In deciding on a plaque, the Board was influenced by the belief that most men, with pardonable pride, would like to display the token of recognition given them by the profession, rather than keep it in the safe, as they would a gold medal.

The amendments that were recommended to the House of Delegates in October 1943 and were accepted in the regular order of business without a dissenting vote read in part as follows:

> To recommend to the Board of Trustees, individuals living or dead, whose contribution to the advancement of dentistry deserves special recognition.
>
> To design an honorary award and make the necessary arrangements for its presentation, to those whom the profession desires to honor. Only one award shall be conferred upon a living person.

While the plan is under the direction of the Patent Committee, the method for the selection of candidates has received a great deal of thought and even now some changes are under consideration. The final set-up will probably be as follows: an advisory group consisting of the secretaries of the several collateral organizations, such as the American Association of Orthodontists, American Academy of Periodontology and American College of Dentists, nine in all; and a recommending committee: the chairman and secretary of the Research Commission, the chairman of the History Committee, the chairman of the Council on Dental Therapeutics and the five members of the Patent Committee, also nine.

As the first step, the chairman of the Patent Committee will write all the above-mentioned persons (seventeen

besides himself) asking for suggestions as to persons who might deserve to be honored. After tabulating these suggestions, he will mail a copy and a regulation ballot to every member of the recommending committee (eight besides himself). The person receiving the highest number of votes—not less than six out of the nine — will be recommended to the Board of Trustees for consideration. A recommendation that fails to obtain ten votes of approval in the Board will not be presented for confirmation to the House of Delegates, which will of course have the final word and which could always vote down the recommendation. It is doubtful whether the recommending committee or the Board of Trustees will dare risk the latter possibility. We may therefore reasonably assume that the men selected will be the most deserving.

As previously indicated, provision has been made in this plan to honor both the living and the dead. Obviously, we should give preference to the living. They should be given recognition while they are still able to receive gratefully the acclaim of their colleagues.

It happens that this year marks the hundredth anniversary of the discovery of nitrous oxide anesthesia by Horace Wells; therefore, it was suggested that the first plaque be dedicated in his honor at Hartford December 11, during the celebration of his great discovery, subject of course to confirmation and approval by the House of Delegates.

It is proposed that awards conferred upon the living be made in duplicate, one for the recipient, the other to be kept by the American Dental Association. These, together with the plaques dedicated to the illustrious dead, would be hung at some place designated for that purpose, in the new building, constituting Dentistry's "Hall of Fame."

At last the dental profession is in position to show its gratitude to the great and near great, living or dead, who have served it and contributed to its progress. While it would seem that this came about because the Process Patent Committee was looking for something to do, actually the idea was not original with the committee. The subject had been discussed for many years among those interested in the welfare of Dentistry. The only credit that the committee may claim is the development of the plan and maintenance of interest in it until it was finally adopted.

M. D. K. BREMNER, *Chairman*,
Patent Committee.

RESEARCH COMMISSION

LIST OF CERTIFIED DENTAL MATERIALS

(As of December 1, 1944)

ONE of the first projects to be undertaken by the A.D.A. Research Associates since returning to full time on the dental program has been a survey of the testing programs of the manufacturers of certified materials. The great majority of these manufacturers have been testing their products regularly, as agreed when certification of their products was accepted. In the present list, the names of products the manufacturers of which have not been carrying on a testing program have been dropped.

The list of hydrocolloidal impression materials includes those products previously on the list whose manufacturers have been able to produce material complying with the specification since agar was released by the WPB.

Materials certified by the manufacturers and tested and found to comply with the A.D.A. specifications since the last publication of the list have been inserted in their proper places in this new printing.

In purchasing certified materials for use in dental practice, these lists should be used as a buyer's guide. In addition, the package of material received should be checked for its exact name as given in the lists, and for a statement guaranteeing compliance with the specification.

CERTIFIED AMALGAM ALLOYS (A.D.A. SPECIFICATION NO. 1)

Alloy	Manufacturer or Distributor
Accurate Metalloy (filings)	The L. D. Caulk Co.
Ackerman (filings)	Ackerman Dental Mfg. Co.
Argentum "A" cut, fine cut, medium cut, shavings	Hammond Dental Mfg. Co.
Aristaloy	Baker and Co., Inc.
Banner (filings)	Goldsmith Bros. S. & R. Co.
Blue Diamond (filings)	Reliance Dental Mfg. Co.
Certified	Lee S. Smith and Son Mfg. Co.
Cresilver	Crescent Dental Mfg. Co.
Dee (filings)	Thos. J. Dee & Co.
Diamond Edge	Young-Baker & Co.
Fellowship, New	Dental Protective Supply Co.
Fleck's	Mizzy, Inc.
Garfield's	Garfield Smelting and Refining Co.
Gold Bond	Jefferson Laboratories
Lustraloy Regular, Cut T	Pfingst & Co.
Minimax (filings) 173, 177, 178, 183 White Gold & Platinum; (shavings) 177, 178	The Minimax Co.
Mission No. 5, No. 5 "A" Cut, No. 6	Henry F. Bruce Co.
Modeloy (Quick Setting filings)	Crescent Dental Mfg. Co.
Mynol Improved	Mynol Chemical Co.
New Deal	Miller Dental Co.
Ney-Aloy, Ney's No. 125	The J. M. Ney Co.
Odontographic "Improved" (filings)	Odontographic Mfg. Co.
Pearlol	Wildberg Bros. S. & R. Co.
Research Oralloy	Precious Metals Research Works, Inc.
Royal Special First Setting, Super First Setting	Garhart Dental Specialty Co.

Silver Crown, Silver Crown Medium	General Refineries, Inc.
Silverloy (filings), (shavings)	Crescent Dental Mfg. Co.
Speyer	Speyer Smelting and Refining Co.
S-C Medium (filings), Quick (filings)	Stratford-Cookson Co.
S-R	Lee S. Smith & Son Mfg. Co.
Standard	Standard Dental Products Co.
True Dentalloy (filings), (cut "A")	The S. S. White Dental Mfg. Co.
Twentieth Century Regulars, Special	The L. D. Caulk Co.
Uniform	Henry Nelms & Son
Vertex	Vertex Dental Products Co.
White Beauty	Lang Dental Mfg. Co.

CERTIFIED INLAY CASTING INVESTMENTS (A.D.A. SPECIFICATION NO. 2)

Investment	Manufacturer or Distributor
Kerr Cristobalite-Inlay	Kerr Dental Mfg. Co.
Ransom and Randolph Gray	The Ransom & Randolph Co.
Security Improved Inlay	The Cleveland Dental Mfg. Co.
Steele's-Super	The Ransom & Randolph Co.

CERTIFIED IMPRESSION COMPOUNDS (A.D.A. SPECIFICATION NO. 3)

Compound	Type	Manufacturer or Distributor
Certified	I	Lee S. Smith & Son Mfg. Co.
Dresch	I	The Ransom & Randolph Co.
Kerr Perfection, No. 2 Soft Green	I	Kerr Dental Mfg. Co.
Mizzy—Low Heat	I	Mizzy, Inc.
S. S. White—Black—Tray	II	The S. S. White Dental Mfg. Co.

CERTIFIED INLAY CASTING WAXES (A.D.A. SPECIFICATION NO. 4)

Wax	Manufacturer or Distributor
Caulk-Blue	The L. D. Caulk Company
Kerr-Blue—Hard	Kerr Dental Mfg. Co.
Security	The Cleveland Dental Mfg. Co.
Sterling	Baker & Co., Inc.
Taggart's Green	Mizzy, Inc.

CERTIFIED INLAY CASTING GOLD ALLOYS (A.D.A. SPECIFICATION NO. 5)

TYPE A, SOFT

Alloy	Manufacturer or Distributor
Aderer-A-Soft	Julius Aderer, Inc.
Baker Inlay Soft	Baker & Co., Inc.
Bruce "A", No. 1	Henry F. Bruce Co.
Chilcast No. 1	Vernon-Benshoff Co.
Crown Inlay No. 2 Soft, K	General Refineries, Inc.
Deeone	Thos. J. Dee & Co.
Jelenko Special Inlay	J. F. Jelenko & Co., Inc.
Krause Soft Inlay	Krause Gold Refinery
Research-A-Soft	Precious Metals Research Works, Inc.
Spyco Soft	Spyco Smelting & Refining Co.
S. S. White No. 2, No. 900, No. 940	The S. S. White Dental Mfg. Co.
Stern S	I. Stern & Co., Inc.
Williams No. 3, Will-Cast 22	The Williams Gold Refining Co., Inc.

TYPE B, MEDIUM

Alloy	Manufacturer or Distributor
Aderer-B-Medium	Julius Aderer, Inc.
Baker Inlay Medium	Baker and Co., Inc.
Bruce "O", No. 2	Henry F. Bruce Co.

Chilcast M, 1M, 2M	Vernon-Benshoff Co.
Crown Inlay No. 1 Hard, Knapp No. 2, T	General Refineries, Inc.
Deetwo	Thos. J. Dee and Co.
Jelenko Modulay, Platincast	J. F. Jelenko & Co., Inc.
Krause Hard Inlay	Krause Gold Refinery
Nelms E	Henry Nelms & Son
Ney-Oro A-1, A-10	The J. M. Ney Co.
Spyco Medium	Spyco Smelting & Refining Co.
S. S. White No. 1, No. 5, No. 820	The S. S. White Dental Mfg. Co.
Stern 1, No. 3290	I. Stern & Co., Inc.
Tinker No. 1, Inlay	Spyco Smelting & Refining Co.
Wildberg "A"	Wildberg Bros. S. & R. Co.
Williams Pioneer, Special Inlay	The Williams Gold Refining Co., Inc.

TYPE C, HARD

Alloy	Manufacturer or Distributor
Aderer-C-Hard, "Dressel"	Julius Aderer, Inc.
Baker Hard Inlay	Baker & Co., Inc.
Bruce No. 3, No. 5	Henry F. Bruce Co.
Chilcast No. 2, No. 2-H	Vernon-Benshoff Co.
Crown No. 9, Knapp No. 3, Supreme Inlay, TT	General Refineries, Inc.
Deesix	Thos. J. Dee & Co.
Jelenko Durocast, Firmilay	J. F. Jelenko & Co., Inc.
Krause KK.	Krause Gold Refinery
Research Hard Cast No. 5, Inlay	Precious Metals Research Works, Inc.
Spyco No. 6	Spyco Smelting & Refining Co.
S. S. White No. 8, No. 13, No. 860 Hard	The S. S. White Dental Mfg. Co.
Stern 2, 3337, 3465, 6485	I. Stern & Co., Inc.
Tinker No. 1 H, No. 2	Spyco Smelting & Refining Co.
Wildberg "C"	Wildberg Bros. S. & R. Co.
Williams Klondiker, No. 1, Special "Four"	The Williams Gold Refining Co.

CERTIFIED DENTAL MERCURIES (A.D.A. SPECIFICATION NO. 6)

Mercury	Manufacturer or Distributor
Argentum	Hammond Dental Mfg. Co.
Ballard's	Quicksilver Producers Association
Chemically Pure	The S. S. White Dental Mfg. Co.
Crown	General Refineries, Inc.
Dee	Thomas J. Dee & Co.
Dental, C.P.	F. W. Berk & Co., Inc.
Fellowship	Dental Protective Supply Co.
Garfield's	Garfield S. & R. Co.
Garhart's Positively Pure	Garhart Dental Specialty Co.
Krause's Pure	Krause Gold Refineries
Minimax	The Minimax Co.
Mission	Henry F. Bruce Co.
Mynol	Mynol Chemical Co.
Ney's C.P.	The J. M. Ney Co.
Odontographic	Odontographic Mfg. Co.
Research	Precious Metals Research Works, Inc.
Spectropure	Baker & Co., Inc.
Twentieth Century	The L. D. Caulk Co.
Williams	The Williams Gold Refining Co., Inc. (Applies to Williams' one pound bottles only, as quarter pound containers are not glass.)

CERTIFIED WROUGHT GOLD WIRE ALLOYS (A.D.A. SPECIFICATION NO. 7)

Alloy	Manufacturer or Distributor
Aderer No. 1, No. 3, No. 4, No. 20 Clasp	Julius Aderer, Inc.
Baker 21, Q. A.	Baker & Co., Inc.
Crown Hylastic	General Refineries, Inc.
Deepep-Hard	Thomas J. Dee & Co.
Jelenko No. 3 Wire, Super Wire	J. F. Jelenko & Co., Inc.
Ney-Oro Elastic No. 4, Neydium 9	The J. M. Ney Co.
Spyco No. 2, No. 4	Spyco Smelting and Refining Co.
S. S. White No. 12, No. 61 Metalba	The S. S. White Dental Mfg. Co.
Stern No. 2657	I. Stern and Co., Inc.
Williams No. 1 Super, No. 2 High Fusing Clasp, No. 3 High Tensile	The Williams Gold Refining Co., Inc.
Vernon-Benshoff Clasp Wire No. 6	Vernon-Benshoff Co.

CERTIFIED ZINC PHOSPHATE CEMENTS (A.D.A. SPECIFICATION NO. 8, FIRST REVISION)

Cement	Manufacturer or Distributor
Ames Z-M	The W. V-B Ames Co.
Bosworth's Zinc	Harry J. Bosworth Co.
Caulk Crown and Bridge, Petroid Improved, Tenacin	The L. D. Caulk Co.
Certicem	Lee S. Smith and Son Mfg. Co.
Fleck's Extraordinary	Mizzy, Inc.
Lang Dental Crown Bridge and Inlay	Lang Dental Mfg. Co.
S-C	Stratford-Cookson Co.
Smith's	Lee S. Smith and Son Mfg. Co.
S. S. White Silver Improved, Zinc, Zinc Improved	The S. S. White Dental Mfg. Co.

CERTIFIED SILICATE CEMENTS (A.D.A. SPECIFICATION NO. 9)

Cement	Manufacturer or Distributor
Ames Plastic Porcelain	The W. V-B Ames Co.
Astralit	Premier Dental Products Co.
Baker Plastic Porcelain	Baker & Co., Inc.
DeTrey's Synthetic Porcelain	The L. D. Caulk Co.
Durodent Enamel	Oskar Schaefer
Smith's Certified Enamel, Improved	Lee S. Smith & Son Mfg. Co.
S. S. White Filling Porcelain, Improved	The S. S. White Dental Mfg. Co.

CERTIFIED HYDROCOLLOIDAL IMPRESSION MATERIALS (A.D.A. SPECIFICATION NO. 11)

Material	Manufacturer or Distributor
Declastic	Thomas J. Dee and Co.
Dentocoll	The L. D. Caulk Co.
Kerr Hydro-Colloid	Kerr Dental Mfg. Co.
Perfectocoll	Baker & Co., Inc.
S. S. White Elastic Colloid	The S. S. White Dental Mfg. Co.
Surgident	Surgident, Ltd.

CERTIFIED DENTURE RESINS (A.D.A. SPECIFICATION NO. 12)

Material	Form	Manufacturer or Distributor
Acralite	Clear, pink; powder-liquid	Acralite Co., Inc.
B-B	Clear, pink; powder-liquid	Bell Dental Products Co.
Coralite	Pink; powder-liquid	Coralite Dental Products Co.
Crystolex, Form 102	Pink; powder-liquid	Kerr Dental Mfg. Co.
Densene	Clear, pink; powder-liquid	Cosmos Dental Products, Inc.
Lang's	Pink; powder-liquid	Lang Dental Mfg. Co.
Lucitone	Clear, pink; plastic cake	
	Clear, pink; powder-liquid	The L. D. Caulk Co.

Luxene 44	Pink; plastic cake	Luxene, Inc.
Marvel	Pink; powder-liquid	Marvel Dental Products Co.
Opalex "45"	Pink; powder-liquid	The Opalex Co.
Vernonite	Clear, pink; plastic cake Pink; powder-liquid	Vernon-Benshoff Co.
Vitacrilic D	L Pink; powder-liquid	Fricke Dental Mfg. Co.
Vita-Lite	Clear, pink; powder-liquid	Vita-Lite Products Co.
Vitalon	Clear, pink; powder-liquid	Austenal Laboratories, Inc.

ALGINATE TINFOIL SUBSTITUTE AND IMPRESSION MATERIAL

The following manufacturers have been granted licenses by the Department of Commerce to make the alginate base tinfoil substitute or the alginate base impression material described in patents No. 2,333,679 and No. 2,359,512 issued to Schoonover and Dickson, of the National Bureau of Standards, and assigned to the Government of the United States, as represented by the Secretary of Commerce.

Manufacturer	Licensed for
Thos. J. Dee & Co.	Impression material
Plastodent, Inc.	Impression material
Vernon-Benshoff Co.	Impression material
The S. S. White Dental Mfg. Co.	Tinfoil substitute

December 2, 1944
Washington, D. C.

M. D. HUFF, *Chairman*
DANIEL F. LYNCH, *Secretary*

COUNCIL ON DENTAL EDUCATION

NEWS

THE name of the National Association of Dental Examiners has been changed to the American Association of Dental Examiners, the charter having been renewed with the amended name the first of this month.

William N. Hodgkin, of Warrenton, Va., was reappointed by the American Dental Association at its last meeting as a member of the Council on Dental Education for a term of three years, to succeed himself.

Robert P. Thomas, of Louisville, Ky., retired from the Council and Wilbert Jackson, of Clinton, N. C., was appointed by the Association to fill the unexpired term of Dr. Thomas. There are two remaining years.

A. C. Wherry, of Salt Lake City, Utah, was reelected to the Council for three years.

John P. Burke has been appointed dean of the School of Dentistry of Georgetown University to succeed Joseph L. B. Murray, who resigned some months ago.

Julio Endelman has been appointed dean of the College of Dentistry of the University of Southern California to succeed Lewis E. Ford, who has retired. Dr. Ford has been named dean emeritus.

HARLAN H. HORNER, *Secretary*

COMMITTEE ON ECONOMICS

DENTAL SERVICE IN MEDICAL PREPAYMENT PLANS

Prepayment Medical Care Organizations. Bureau Memorandum No. 55, Bureau of Research and Statistics, Social Security Board, Washington, 1944. 130 pp. (For sale by Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., 30 cents.)

THIS book recently published by the Social Security Board is an interesting survey of economic developments in the field of medical service. While essentially a directory of medical care programs existing in the United States in 1943, it presents a great deal of information on the characteristics of 219 prepayment programs sponsored by industry, medical societies, private group clinics, consumers and government. In addition to the identifying information, the report presents a brief summary of eligibility requirements, coverage, personnel, services provided and charges.

Of special interest to the dental profession is the fact that this volume includes essential details on dental service provided under these plans. While the 219 programs provided varying amounts of medical service to about 3,300,000 subscribers and dependents, ninety-nine of the programs, covering about 1,800,000 persons, included some dental service. The following is the full analysis of the status of dental care as published in the report:

A few organizations provide fairly comprehensive dental services, including examinations, extractions, fillings, prophylaxis, diagnostic x-ray, surgery and prosthetic work, but more generally dental care is limited to one, two or three of the following types of services: extractions, x-ray, prophylaxis, examinations. The organizations which include prosthetic work usually charge patients for at least the cost of materials.

About half the persons eligible for services in the 214 prepayment medical care organizations in 1943 were also entitled to some type of dental service on a prepayment or reduced-fee basis (Table 4). More than 500,000 could receive a substantial amount of dental care on a prepayment basis—at least extractions and fillings, and one other service, usually prophylaxis or x-ray examinations; about 350,000 could get similar services on a reduced-fee basis; while an additional 933,000 were eligible for one or two of these services on either a prepayment or reduced-fee basis.

Industrial plans provided some type of dental care for 67 per cent of their membership—subscribers and dependents. About half the persons (541,000) were entitled to relatively little care; 269,000 could get more care, but on a reduced-fee basis; while 150,000 were eligible for substantial care on a prepayment basis.

Dental care is provided more frequently by governmental plans than by any others. A large proportion of all persons eligible for fairly comprehensive care were members of governmental plans or agricultural groups in consumer-sponsored plans financed in part from Federal funds.

More than 80 per cent of the persons eligible for care through the medical society plans in Washington and Oregon could also receive one or two types of dental service; but none of these plans provided more comprehensive dental care. No medical society plans outside these states include any form of dental care.

Fourteen of the twenty-four group clinics include dentistry among the services provided on a prepayment basis. About 22 per cent of the persons covered by these plans were eligible for a substantial amount of dental care on a prepayment basis; 15 per cent could receive such care on a reduced-fee basis, while an additional 30 per cent were eligible for one or two types of dental care.

Eighty-one dentists were employed full-time and eighty-three were employed part-time by a total of twenty-seven organizations, mainly industrial concerns. Fifteen additional organizations used dentists in the communities served, while fifty-seven organizations listed as having provision for some dental service did not specify the arrangements. It might be assumed that many of these employed dentists in their private offices. In twenty-two of the latter group, only diagnostic x-ray service was provided.

This report again verifies previous statements that there is no actual full-service dental plan based upon the prepayment

principle in operation in this country for the general public. In most of the plans described, dental service is extremely limited, usually consisting of diagnostic or emergency service. A few plans approach the point of providing all essential services, but these involve payment of supplementary charges or (in the instance of industrial plans) are dependent for financial stability on substantial company contributions. A review of the premium rates raises a vital question concerning many of the plans as to whether these programs would remain financially sound if all of the subscribers requested all of the services for which they are eligible under the contract.

Groups in the American Dental Association and its component societies have been studying for some time the problems involved in establishing a sound dental care program upon a prepayment basis. These groups have estimated that an annual premium of $10 to $15 would be required to provide essential service—examinations, prophylaxis, fillings and extractions—on a maintenance basis in the amount necessary and to the number of subscribers needing it. One interesting industrially sponsored program described in the volume has 4,673 subscribers, 95 per cent of the employes of the corporation, and provides surgical care, hospital care and cash disability benefits of $2 per day for illness and off-duty accidents. It provides dental service through private dentists in the surrounding area. In this instance, the program pays 50 per cent of members' dental fees up to $25 in any one year. The total charge to subscribers for all services is $1.50 per month. The corporation covers the expense of administering the plan.

In summary, "Prepayment Medical Care Organizations" is a digest of essential information on the status of a large majority of existing dental and medical prepayment programs. It will serve as an excellent handbook for dentists who wish to become informed upon this subject.

COMMITTEE ON LEGISLATION

DENTAL PRACTICE ACTS; ANNUAL RENEWAL FEE; FORFEITURE OF DENTAL LICENSE BY FAILURE TO PAY ANNUAL RENEWAL FEE; BOARD'S RIGHT TO REQUIRE EXAMINATION FOR RENEWAL

In June 1925, Henry R. Fischwenger made an application for a license to practice dentistry in Florida. He took the examination given by the Florida State Board of Dental Examiners and passed it, and was issued a license to practice. Thereafter, he applied for and obtained his annual renewal licenses for the years 1926 and 1927. In 1927, Dr. Fischwenger abandoned his practice and left the state of Florida, and at no time thereafter until 1943 did he attempt to secure his annual renewal license.

The statute under which he was admitted to practice in 1925 and under which he became delinquent required the payment of an annual renewal license fee and stated that any license granted by the board would be automatically cancelled if the holder thereof failed to renew it each year. It provided, however, that any license that had been cancelled automatically for failure to pay the annual renewal fee could be restored on written application to the board and the payment of $25, without the applicant's submitting to an examination.

In 1941, the legislature of Florida repealed the annual renewal provisions in the Florida dental practice act and enacted two new sections. One section required an annual renewal license fee somewhat similar to the old provision.

The other section required the Board to send certain notices to all dentists who were delinquent in their renewal fees, the last notice to be sent by registered mail with return receipt attached and to state that if the delinquent dentist failed to apply for his renewal certificate and to pay the required fee within the time specified, he must submit to an examination.

In 1943, Dr. Fischwenger applied to the board to have his license renewed without examination, tendering to the board such fees as he thought necessary. The board refused to issue a renewal certificate, contending that Dr. Fischwenger had forfeited his privilege to practice dentistry in the state of Florida by not keeping his license in force from year to year, and that he, therefore, could not be restored to practice without taking a new examination, pursuant to the provisions of the new law.

Dr. Fischwenger contended that the Florida Dental Board had failed to give him the notices required in the new law, and that he therefore was privileged to renew his license at any time under the provisions of the law in force in Florida at the time that he was granted a license.

The Supreme Court of Florida decided that, by his failure to keep his license in force, Dr. Fischwenger had completely forfeited his privilege to practice dentistry in that state, and since he was not a duly licensed dentist in Florida at the time that the new law was passed, the Board was not required to send him any notice and that his right thereafter to practice his profession was subject to the conditions imposed by the new statute.

The court said that the practice of dentistry in the State of Florida is not an absolute, unqualified or vested right, but is a privilege that may be exercised only in subordination to the police power of the state. When conflicts occur between the right of the citizen to follow such profession and the right of the state to preserve the general health and welfare, the right of the citizen in the matter must yield to the power of the state to prescribe such reasonable restrictions and regulations as may be necessary to protect the people from ignorance, incapacity, deception or fraud. The conditions prescribed by the law previous to 1941, whatever they may have been, did not prevent the state from making such further regulations and restrictions regarding the practice of dentistry as the legislative authority deemed necessary or proper in the public welfare, so long as such further restrictions and regulations were reasonable and bore some just relation to the matter sought to be regulated.

The 1941 Dental Practice Act was passed for reasons deemed sufficient by the legislature. The new statute superseded prior statutes on the same subject and imposed new and more rigid requirements as a condition to continuation in practice. Furthermore, it abolished the privilege previously granted to delinquent dentists under the 1925 and 1931 acts to reinstate their licenses at any time without taking an examination.

The Florida State Board of Dental Examiners was clearly within its authority in requiring Dr. Fischwenger to take an examination as a preliminary condition to the issuance of a renewal certificate. (Fischwenger *v.* York, Volume 18, Southern Reporter, 2nd Series, page 8; Florida 1944.)

OBITUARY

JOHN VAN DER BIE CONZETT, D.D.S., D.Sc., F.A.C.D. (1866-1944)

JOHN VAN DER BIE CONZETT, Past President of the American Dental Association and pioneer dentist, died at his home in Dubuque, Iowa, Tuesday morning, November 14, 1944. He was 78 years of age.

John Conzett, son of Josiah and Nellie Van der Bie Conzett, was born July 2, 1866, in Dubuque, Iowa. His career of fifty-seven years is marked by professional triumphs, the confidence and respect of his community and the warm friendship of his associates. He is one of whom it may well be said that no power on earth could ever swerve him from doing his duty according to the dictates of his conscience or of living up to the highest ethics of his honored profession.

It has been noted that John Conzett was born during the reconstruction period following the Civil War, and the spirit of initiative and determination of that time is personified in his ideas and the works that have figured so prominently in the progress and advancement of modern dentistry.

John attended the schools in Dubuque and found his vocation early in life. When a boy of 14, he entered the office of C. J. Peterson, an outstanding dentist of the era, under whom he served as an apprentice for six years. In 1886, having satisfactorily completed his preparatory study of basic sciences under private tutors, he entered the College of Dentistry of the State University of Iowa. In 1887, he appeared before the Iowa State Board of Dental Examiners, which issued to him a license to practice dentistry, and he began the practice of his profession in Dubuque during the month of May of the same year.

Dr. Conzett married Miss Mae Corrance, of Dubuque, March 31, 1891. One son was born to bless this union, Donald, now a lieutenant colonel in the Medical Corps, U. S. Army, serving in France.

JOHN V. CONZETT, D.D.S., D.Sc., F.A.C.D. (1866-1944)

Dr. Conzett became a member of the Iowa State Dental Society in 1899 and at once entered into the activities of the society. He served on various committees, was a member of the Iowa State Board of Dental Examiners and was chosen president of the Iowa State Dental Society, in 1905. Through his activi-

ties and contacts in the Iowa State Dental Society, he met E. K. Wedelstaedt, of St. Paul, who was to be the greatest influence in his professional career. He studied with Dr. Wedelstaedt and, through these studies, became interested in the system of Black's operative dentistry. True to his benevolent spirit of sharing his knowledge with his fellow practitioners, Dr. Conzett organized the Wedelstaedt Study Club, in 1902, of which he was lecturer and president for many years. It was through this club that many of the fine men of the dental profession in Iowa learned the principles of Black's operative dentistry.

At the invitation of C. E. Woodbury, of Council Bluffs, Iowa, Dr. Conzett, with William Finn, journeyed to Omaha and assisted in the organization of the Woodbury Study Club. He gave clinics and lectured before that group for many years and was elected an honorary member of the organization. He served as lecturer on operative dentistry at Drake University and as special lecturer on the faculty of the Kansas City Dental College for many years.

Dr. Conzett was in constant demand as a lecturer and clinician by study clubs and societies throughout the entire United States. He gave generously of his time, and lectured frequently before study clubs of Springfield and Peoria, Ill. and New York, N. Y. It was largely through his informative lectures and fine personality that the system of Black's operative dentistry was accepted by the dental profession in the East.

In 1904, an invitation was tendered him to appear on the program of the World's Dental Congress in St. Louis. In 1905, he became a member of the National Dental Association. Very soon, his executive ability was recognized, for he was asked to serve as chairman of the Clinics Committee of that organization in 1913 and again in 1914, when the society was reorganized as the American Dental Association.

During this time, the importance of research became recognized. Dr. Conzett, together with Thomas P. Hinman, Weston A. Price, Clarence J. Grieves and Eugene R. Warner, organized the Research Commission of the American Dental Association. He served for many years as secretary of the commission, one of the most important committees of the American Dental Association, and it was through the activities of the commission that the Bureau of Standards undertook the standardization of the various filling materials used by the dental profession.

During the early part of the twentieth century, many dental colleges were being organized. In order that the educational requirements and curricula of these colleges might be standardized and elevated, the American Dental Educational Council was started. Dr. Conzett was appointed a member of this council to represent the American Dental Association, and he continued to serve for twenty-five years, being president for three years. It was during this period that the Carnegie Foundation, under the guidance of W. J. Gies, made its survey of dental education. Dr. Conzett and the other members of the council gave unselfishly of their time, traveling about examining the schools, and aiding in this survey, which, with the publication of its studies, marked an epoch in the evolution of dentistry.

It was largely through the efforts of the Dental Educational Council that the profession of Dentistry was recognized by the War Department and, as a result, the Dental Corps was organized.

The fine services rendered to the profession were appreciated. Dr. Conzett was named honorary vice-president of the Panama Pacific World's Congress in San Francisco in 1915. At a meeting of the American Dental Association in Chicago in 1918, he was chosen President Elect. He was inducted into the office of President at the meeting in New Orleans in 1919 and presided at the meeting held

in historic Boston in 1920. Many leaders of the dental profession of Europe, including Sir Kenneth Goadby, attended this memorable meeting. It was at this meeting that the American College of Dentists was founded, Dr. Conzett being made a fellow and chosen to serve as the first president. He was also a member of the National Board of Dental Examiners and served as chairman of that body for many years.

In 1919, he received an honorary degree of doctor of science from the University of Dubuque, and, in 1920, the University of Pittsburgh bestowed upon him the honorary degree of doctor of dental science.

When William Taggart was perfecting the gold inlay, he called upon Dr. Conzett to develop the cavity preparation. This he did by modifying the Black system to meet the requirements of the gold inlay. This technic was given to the profession and published in a series of articles in the *Dental Items of Interest* in 1911. For this fine contribution to dentistry, he was made a fellow of the Chicago Odontographic Society and the New York Academy of Dentistry.

Dr. Conzett was the author of the operative portion of Ward's "American Text Book of Operative Dentistry." Roscoe H. Volland, of Iowa City, illustrated the text. Dr. Conzett was also the author of a series of articles on "How to Make Gold Fillings," which were published in the *Dental Digest* several years ago, and of many other articles published in THE JOURNAL, *Dental Cosmos* and other dental periodicals.

In 1930, a group of dentists in Dubuque organized a pathology study club, and invited Dr. Conzett to act as its leader. In 1932, the name of this study club was changed to the Conzett Study Club. Dr. Conzett was the active leader of the group up until the time of his illness.

He was a member of the local and state dental societies, the Chicago Dental Society, the American Dental Society of Europe and the American Dental Association. He was also a member of the honorary dental fraternity, Omicron Kappa Upsilon, and a life member of Delta Sigma Delta Fraternity.

While he gave freely of his time to his profession, Dr. Conzett was also active in the affairs of his community. He assisted in the organization of the Y. M. C. A. and was the first president, continuing to serve in this office for seventeen years. At the time of his death, he had the distinction of holding the longest continuous membership in this organization. He was a member of the board of directors of the Dubuque Bank and Trust Company and chairman of the board of the Federal Discount Corporation.

True to the tradition of the pioneer Conzett family, he identified himself with the Westminister Presbyterian Church, serving as elder, as Sunday school teacher and as a member of the choir for many years. He was in every way one of its most faithful supporters. In addition, he was always an active supporter of all community projects—cultural, educational, civic and philanthropic.

During the fifty-seven years that he devoted to dentistry, Dr. Conzett enjoyed an excellent practice. He counted as his personal friends the greatest in dentistry, including such men as G. V. Black, Truman W. Brophy, C. N. Johnson, C. Edmund Kells, Clarence J. Grieves, J. P. Buckley, William H. Taggart and Chalmers J. Lyons.

Dr. Conzett's high ideals and outstanding works have been an inspiration to many dentists, not only in Iowa, but also throughout the United States, and his contribution to the progress and advancement of modern dentistry shall live on.

He is survived by his wife, four brothers, his son and two grandchildren, John Castleman and Donna Conzett.

LESLIE M. FITZGERALD, D.D.S.

DEATHS

ANTHONY, CAMDEN U., Dubois, Pa.; Philadelphia Dental College, 1900; died October 11; aged 78.

BAKER, GUY L., Beverly, Mass.; Harvard University Dental School, 1922; died October 17; aged 35.

BATE, JACOB, St. Petersburg, Fla.; New York College of Dentistry, 1888; died November 2; aged 84.

BERKHEIMER, FRANK W., Roaring Spring, Pa.; Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 1910; died in October.

BLACHEY, CARL W., Centerville, Iowa; Des Moines College of Dental Surgery, 1902; died October 24; aged 66.

BONER, JAMES CRAIG, Falls Creek, Pa.; University of Pittsburgh, School of Dentistry, 1902; died October 30; aged 71.

BRUNK, WALTER C., Detroit, Mich.; Western Reserve University Dental School, 1924; died October 7; aged 48.

BURKHART, DAVID I., Seattle, Wash.; Tacoma College of Dental Surgery, 1896; died October 23; aged 72.

CONZETT, JOHN V., Dubuque, Iowa; University of Pittsburgh, 1920; died November 14; aged 78.

DAVIS, CLINTON C., Detroit, Mich.; Tufts College Dental School, 1906; died October 31; aged 59.

DUCASSE, ANTOINE L., New Orleans, La.; Tulane University of Louisiana, College of Medicine, School of Dentistry, 1903; died November 4; aged 65.

EDGAR, G. D., Defiance, Ohio; University of Michigan, College of Dental Surgery, 1897; died October 24; aged 71.

EKSTROM, STANLEY E., Concord, N. H.; Tufts College Dental School, 1940; killed in action in the Pacific; aged 32.

ELZEY, OTIS W., Washington, D. C.; Baltimore College of Dental Surgery, 1898; died November 4; aged 66.

EPSTEIN, JULIUS, New York, N. Y.; Columbia College of Dental and Oral Surgery, 1934; killed in action November 22; aged 34. Dr. Epstein was a lieutenant in the Army Dental Corps.

FIRESTONE, SAMUEL, Pittsburgh, Pa.; University of Pittsburgh, School of Dentistry, 1909; died October 19; aged 64.

FRED, THOMAS W., Washington, D. C.; died October 12; aged 67.

FREEMAN, BENJAMIN, New York, N. Y.; New York College of Dentistry, 1897; died October 30; aged 72.

GARRETT, H. L., Roswell, Ga.; Atlanta Dental College, 1911; died November 11; aged 65.

GELBER, AARON, New York, N. Y.; died October 25; aged 63.

GOSLEE, W. A., Auburn, Nebr.; Chicago College of Dental Surgery, Dental Department of Loyola University; died October 18; aged 68.

HAMMERLE, AUGUSTUS R., Warren, Ohio; Ohio College of Dental Surgery, Dental Department of University of Cincinnati, 1903; died November 2; aged 66.

HARDY, HARVEY W., Boston, Mass.; Harvard University Dental School, 1896; died October 23; aged 77.

HART, C. E., Altoona, Pa.; Pennsylvania College of Dental Surgery, 1897; died October 17.

HEATON, JOHN ALBIAN, Hoopeston, Ill.; Chicago College of Dental Surgery, Dental Department of Loyola University, 1898; died October 26; aged 72.

HOOD, CLARENCE O., Beverly, Mass.; Tufts College Dental School, 1889; died November 8; aged 81.

HOOPINGARNER, J. T., Indianapolis, Ind.; Indiana University School of Dentistry, 1905; died November 4; aged 59.

KOFOED, JOHN W., Norwood, Pa.; Temple University School of Dentistry, 1916; died November 3; aged 49.

KULNICK, VICTOR C., Menasha, Wis.; Marquette University, School of Dentistry, 1919; died November 1; aged 49.

LARRICK, SAMUEL M., Fredericktown, Ohio; Ohio Medical University, College of Dentistry, 1904; died October 24; aged 65.

LITTLE, WILLIAM E., Crystal Lake, Ill.; Columbian Dental College, 1895; died November 5; aged 72.

LUETKEMEYER, CHARLES B., Freeburg, Mo.;

Barnes Dental College, Dental Department, St. Louis, 1915; died October 9; aged 55.

McINTYRE, THOMAS R., Minneapolis, Minn.; University of Minnesota, College of Dentistry, 1935; killed in action in the South Pacific in November; aged 34. Dr. McIntyre was a lieutenant (j.g.) in the Navy Dental Corps.

McKINNON, FREDERICK W., Boston, Mass.; Tufts College Dental School, 1914; died October 21; aged 52.

MARTIN, A. M., Pittsburgh, Pa.; Pittsburgh Dental College, Department of Western University of Pennsylvania, 1907; died October 24; aged 68.

MOOMAW, ORA A., Colorado Springs, Colo.; St. Louis University School of Dentistry, 1922; died October 9; aged 44.

MOORMAN, HENRY DEAN, Aurora, Ill.; University of Louisville, School of Dentistry, 1901; died October 31; aged 67.

MUSTAIN, HEDGEMAN D., West Palm Beach, Fla.; Western Dental College, Kansas City, 1908; died November 9; aged 68.

NIGGEL, CLEMENT D., Pittsburgh, Pa.; University of Pittsburgh, School of Dentistry, 1924; died October 19; aged 44.

NORMAN, ARTHUR J., Detroit, Mich.; Northwestern University Dental School, 1919; died October 24; aged 63.

NORTON, JACOB W., Haverhill, Mass.; Baltimore Medical College, Dental Department; died November 7; aged 66.

PEDERSEN, T. V., Omaha, Nebr.; Creighton University, College of Dentistry, 1928; died November 13; aged 42.

PHILLIPS, WILLIAM R., Glendale, Calif.; University of Southern California, College of Dentistry, 1924; died November 3; aged 53.

PRESSLEY, W. A., Rock Hill, S. C.; University of Maryland, School of Dentistry and the Baltimore College of Dental Surgery, 1890; died November 7; aged 78.

SHURTLEFF, CHARLES H., Des Moines, Iowa; Chicago College of Dental Surgery, Dental Department of Loyola University, 1900; died November 21; aged 55.

STEFANSKI, C. J., Detroit, Mich.; University of Detroit Dental School, 1943; died in June.

SULLIVAN, GEORGE, Gunnison, Colo.; School of Dentistry, University of Denver, 1908; died October 17.

SWANDER, EDWARD O., Springfield, Mass.; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1914; died October 23; aged 61.

SWANSON, FRANK A., De Witt, Iowa; State University of Iowa, College of Dentistry, 1928; died October 19 at Camp Robinson, Ark.; aged 40. Dr. Swanson was a captain in the Army Dental Corps.

TAFT, EZRA F., Lexington, Mass.; Harvard University Dental School, 1876; died October 18; aged 98.

TAVLIN, EDNA, Seattle, Wash.; died October 19; aged 52.

TEARE, PAUL N., Greenville, Pa.; University of Pittsburgh, School of Dentistry, 1918; died November 6; aged 50.

TULLER, CHARLES SHEPARD, New Orleans, La.; Chicago College of Dental Surgery, Dental Department of Loyola University, 1901; died November 6.

WALK, WILLIAM J., Milwaukee, Wis.; University of Illinois, College of Dentistry, 1903; died July 22; aged 64.

WALSH, FRANCES M., Chicago, Ill.; Northwestern University Dental School, 1899; died August 22.

WALTERS, ROYAL WILSON, Battle Creek, Mich.; died July 24; aged 37.

WATTS, HARRY L., Brookhaven, Miss.; died August 3.

WEINRIB, MORTON C., New York, N. Y.; Columbia College of Dental and Oral Surgery, 1940; killed in Belgium, September 19; aged 28. Dr. Weinrib was a captain in the Medical Corps.

WEST, J. H., Mansfield, Ohio; Cincinnati College of Dental Surgery, 1899; died March 17; aged 69.

WHEELER, CLIFTON F., Washington, D. C.; Harvard University Dental School, 1917; died October 22; aged 49.

WILEY, WABISHAW SPENCER, East Orange, N. J.; Howard University, College of Dentistry, 1916; died November 1; aged 52.

WILLIAMS, O. N., Colorado Springs, Colo.; Chicago College of Dental Surgery, Dental Department of Loyola University, 1902; died September 1; aged 63.

WOOD, J. F., Ludington, Mich.; George Washington University, Dental Department, Washington, 1907; died August 4.

WOODS, M. J., Lafayette, La.; Atlanta Dental College, 1916; died November 5.

CURRENT LITERATURE

Congenital Dental Defects in Infants Subsequent to Maternal Rubella During Pregnancy

M. W. EVANS

A GROUP of thirty-four babies whose mothers had developed rubella (German measles) were studied. Data were collected with regard to the time of eruption of the teeth, especially the first tooth to erupt, and the occurrence of convulsions. Variations in the number of teeth from the normal were noted and hypoplasia, abnormal tooth form, restricted arch formation, dental caries and gingivitis were graded as to severity. The series were arranged in order of development of the disease during pregnancy and were divided into three groups: (1) a group in which the exanthem occurred before the dental laminae and the enamel organs could usually be detected (sixth week); (2) a group in which the disease was contracted between the sixth week and the ninth week (first appearance of the dental papillae), and (3) a group in which the disease occurred later than the ninth week. A total of twenty-three babies exhibited congenital dental abnormalities, eighteen cases of which were major. All but two of the infants with dental defects showed other congenital malformations. With the exception of two cases, the mothers of all the children with congenital dental abnormalities had contracted rubella at some period during the first three months of pregnancy. Dental defects were most severe in infants belonging to Group 2. The most striking dental abnormality was the retardation of eruption. Enamel hypoplasia and dental caries were also found.—*M. J. Australia*, 10:225, September 2, 1944.

J. E. GILDA.

Fluorine in Drinking Water

L. SPIRA and F. H. GRIMBLEY

A NUMBER of samples of water found, on examination by a colorimetric method, to contain toxic amounts of fluorine, were boiled for five minutes in cooking utensils of enamel, aluminum, tin, glass and stainless steel. In each vessel, the water became turbid, but the degree of turbidity varied in the different vessels. On cooling, the precipitate settled. In each case, a considerable reduction in the fluorine content of the supernatant fluid was demonstrated colorimetrically. Prolonged boiling caused a further reduction. The material of which the vessels are composed had no effect on the extent to which the fluorine was removed. It was, therefore, concluded that an amount of fluorine indicated by the difference between the two estimations had passed into the precipitate. An analysis of the supernatant fluid after two to seven days had elapsed showed a progressive increase in the fluorine content, though not to the original level. Water showing appreciable hardness lost large amounts of fluorine upon boiling. This removal of soluble fluorides is probably mechanical since a slow re-solution takes place. Softening with sodium carbonate and sodium aluminate had little or no effect on the fluorine content of the supernatant fluid. It is therefore suggested that the boiling method possesses a great advantage over the chemical method of separation.—*J. Hyg.*, 43:142, April 1943.

J. E. GILDA.

Dental Abnormalities as Found in the American Indian

C. H. WEBB

MANY people, both professionals and laymen, believe that there is a marked racial resistance or susceptibility to dental disease and that prehistoric peoples had little or no dental disease. The majority of these opinions are, however, without objective basis, although there is evidence that dental caries has progressively increased with the advent of civilization. A brief review of the literature on the dentition of various races, both primitive and modern, showed that dental decay is seen even in the Neanderthal man and that even among prehistoric races there

has been a consciousness of the dentition and its importance.

Among the American Indians, the more general dental characteristics appear to be the so-called "shovel-shaped" upper central incisor, which has a pronounced lingual fossa, five cusped lower molars, end-to-end bite, moderate sized teeth and a mesognathic or orthognathic face. Anthropologic measurements of the palate and mandible show that there are differences in both size and mandibular angle between the American Indians and the European whites. The most frequent congenital abnormalities seen in the prehistoric Indians are supernumerary, congenitally absent, rudimentary, fused and rotated teeth. All forms of dental disease are observed, a high percentage of the primitive peoples losing their teeth before the age of 40. Numerous papers have pointed to a definite relation between the incidence of dental disease and the dietary habits of these races.

The author studied a group of thirty skulls of the protohistoric Caddo Indians found in Louisiana. The general dental development was good, with symmetrical development evident. Examinations revealed many characteristics similar to those observed by other investigators. However, only 12 per cent of the teeth were carious. Apical abscesses, pyorrhea, osteomyelitis, calculus deposits, etc., in varying degrees, were observed. In general, it may be said that the aboriginal Amerinds had almost the same congenital and acquired dental defects as are found in modern man.—*Am. J. Orthodontics,* 30:474, September, 1944.

S. J. FANALE.

A Histopathologic Explanation for the Oral Lesions in Acute Leukemia

L. W. BURKET

THE case of a 12-year-old boy who exhibited the fulmination symptomatology of acute monocytic leukemia, shortly before, and persisting after, a lower molar extraction, is reported. The symptoms included cervical adenopathy, *fetor ex ore,* gingival hypertrophy, ulceration and dusky red coloration, fever, possible splenomegaly and swelling of the face. The patient died eight days after extraction of the tooth.

The micropathologic findings included extensive necrotic areas and substitution for the gingival architecture of a denser accumulation of large mononucleocytes. Necrosis was most marked about the thrombosed vessels in the marginal and alveolar gingivae. The periodontal membrane was relatively intact in the apical region, while the middle third showed many localized areas where numerous extravascular large mononuclear cells were present together with small thrombosed blood vessels. This was thought to be suggestive of necrosis. The gingival third portion was diffusely necrotic. Mononuclear infiltration of the alveolar bone marrow and pulps had occurred. The latter was also diffusely fibrotic. The explanation is offered that the massive gingival necroses are due to thrombosis of the blood vessels supplying these tissues, while the hypertrophy resulted from the extravascular leukemic infiltration and changes characteristic of any area of infarction.—*Am. J. Orthodontics,* 30:516, September, 1944.

S. J. FANALE.

Historical Review of the Treatment of Jaw Fractures

KURT H. THOMA

IN his synopsis of the history of jaw fracture treatment, Dr. Thoma effectively and clearly describes the development of this surgical specialty. He begins with a reference to a papyrus written about 3000-2500 B.C., and points out that little effective treatment was evolved until after Fauchard's time. War, and its attendant increase in incidence of injuries, has always resulted in the improvement of treatment that comes with wider experience. This is especially true of the World Wars I and II. The advent of the widespread use of motor-driven vehicles has likewise furthered this tendency.

The nineteenth century saw various forms of treatment for jaw fractures, including the use of bandages, splints and sutures and ligation of the teeth, the latter being probably the more favored.

An increased interest in dental matters was manifested in the period between the Civil War and World War I as a result of the introduction of new methods into dentistry, such as the vulcanizing of rubber, the swaging of metal and the casting process. In 1887, Gilmer perfected the intermaxillary ligation method, which was

followed by the Gilmer Arch method. Gunning, in 1866, introduced the intra-oral splint, which was followed by various modifications. The author reviews further the contributions of Kazanjian, Ivy, Curtis, Waldron, Gillies *et al.* The period between the world wars saw the improvement of intermaxillary ligation with several variations, the best known being the "eyelet" method. New types of dental splints were also devised. Circumferential wiring and elastic traction came into use at this time. The consensus of opinion on condyle and ramus fracture treatment is also discussed. The author points out that the importance of prophylactic chemotherapy in fracture treatment is universally agreed upon. The tried methods of jaw fracture treatments of the last war, with some modifications, are still employed. It is believed that extra-oral fixation should be reserved for cases in which other types of treatment are not suitable. Dr. Thoma closes his review with his "ten commandments" for the care of patients with injuries of the face and jaws.—*Am. J. Orthodontics,* 30:399-405, August, 1944.

S. J. FANALE.

Absorption of Sulfathiazole from Wounds

R. A. WAND

IN experiments conducted to estimate the concentration of sulfathiazole at different levels below the floor of wounds, when the drug is applied locally directly on the wound, sulfathiazole in varying concentrations, incorporated in different bases, was allowed to remain on the surfaces of artificially induced wounds of the muscular part of the thighs of eight groups of rabbits. The time the sulfa drug was allowed to remain on the wound ranged from one-half to four hours. At the end of each period, 1 cm. square blocks of tissue were removed from the wounds, and frozen, and serial sections were made at 1 mm. levels. Each of these sections was assayed for sulfathiazole content. Samples of blood were obtained at the same time and their sulfa content was also assayed. The concentrations of the sulfathiazole used, in their various bases, were 1, 5 and 100 per cent in polyvinyl alcohol (P.V.A.), 5 per cent in oil-in-water emulsion and 2.5 per cent in each of the following: methyl cellulose, Colebrook's cream, hydrous wool fat and paraffin ointment, B.P.

The author found that the higher the percentage of drug in the bases, the greater the concentration in the tissues. The concentration of the drug in the tissues beyond 2 to 3 m. below the surface of the wound was much less than that ordinarily reached when sulfa was given by mouth, this former contration being probably insufficient to prevent the spread of infection; a fact that may justify systemic administration of the drug. The level of sulfathiazole obtained in the blood when the drug is applied locally approximates that of the tissues situated anywhere between 3 and 7 mm. below the surface of the wound.

The experiments showed further that the delivery of sulfa out of a water soluble base or an oil-in-water emulsion takes place quite readily, but, when incorporated in a fatty or paraffin base and applied to an open wound, very little of the drug reaches the tissues. When suspended in a liquid oil, the sulfa falls out and is deposited in almost the pure state on the surface of the wound or dressing.

The results of this work would indicate that local application of the sulfa would be efficient only in wounds where the bacteria have not penetrated beyond 2 or 3 mm. below the surface.—*Canad. M. A. J.,* 51:229, September 1944.

S. W. LEUNG.

Circumscribed Scleroderma of the Buccal Mucous Membrane

H. W. BARBER

THE author reported, before the Royal Society of Medicine, a case of what appeared to be scleroderma of the oral mucous membrane. This lesion, found on the left side of the lower lip of a man aged 43, was a sharply circumscribed white patch extending from the margin of the vermilion border of the lip to the alveolar sulcus. It was distinguished from leukoplakia by the fact that it was depressed below the level of the surrounding normal mucous membrane. It is said that this type of lesion on the buccal mucous membrane is extremely rare.—*Brit. J. Dermat.,* 56:94, March 1944.

S. W. LEUNG.

Cleft Palate

JOHN W. KEMPER

IN this excellent paper on the cleft palate, the author states that LeMonnier, a French dentist, was reported to have been the first to successfully close a complete cleft of the palate.

The ultimate aim of cleft palate surgery is to produce a palate that will give normal speech. This requires the closure of the inactive structures of the hard palate, in order to separate the two large resonant chambers of the voice; and the union of the divided muscles of the soft palate to form a sphincter-like area, capable of completely sealing off the oral from the nasal pharynx. It is the author's opinion that, for best results, the operations should be completed, provided the health of the child permits, just before, or at the time, the habits of speech are being formed, usually between the fifteenth and twenty-fourth months.

Following this preliminary discussion are detailed accounts of the methods and principles involved in the complete cleft palate operation. The author presents in turn the methods for the closure of the alveolar cleft, the closure of the hard palate cleft, the closure of the soft palate, the method for elongating the palate and, finally, the postoperative program to be followed.

He concludes this paper with the dictum that the operator should be not merely a surgeon, but also a coordinator, consultant, guide and councillor to patients, parents and all those who will assume a rôle in the program for the care and development of the child.—*J. Oral Surg.*, 2:227, July 1944.

R. R. Y. SUNG.

Skin Graft Fixation by Plasma-Thrombin Adhesion

FORREST YOUNG

THE survival of the skin graft depends on early vascularization. This may be delayed or prevented if (1) the graft is too thick; (2) it is of too great an area; (3) the recipient bed is rather avascular or fibrotic, or (4) there is infection present.

In order to assure early vascularization, a complete continuous contact of graft and bed must be maintained. Since complete continuous contact may be prevented by the graft slipping off the bed or being lifted off by bleeding, by depressions under the graft and by frequent movement of the bed, the compression-fixation-suture technic is usually made use of. However, this requires a great deal of patience and time. In order to overcome these drawbacks, the method of plasma-thrombin adhesion is suggested.

For this method, the recipient bed may be either a fresh wound or a granulating area and the grafts may be cut either free hand or with a dermatome. The grafts, however, must not be washed or placed in a saline solution, since this removes the small amount of natural adhesive agents present. For grafting, the bed is flushed with a small amount of stock-pooled plasma, and the under surface of the graft is wet with thrombin solution after being perforated with a pointed knife. It is then quickly spread over the bed and held firmly and smoothly in place for two minutes. No suture or compression dressings are needed. In some instances, a protective dressing has been used. Joints are better splinted.

The normally expected great number of "takes" on fresh surgical beds are obtained, but on granulating beds, the percentage is lower than normally expected. Small grafts take better than large ones.

The author suggests that this method is useful in applying grafts on fresh surgical beds, in holding grafts in position while compression dressings are applied and in applying small grafts.—*Ann. Surg.*, 120:450, October 1944.

R. R. Y. SUNG.

ANNOUNCEMENTS

ANNOUNCEMENTS must be received by the fifth of the month in order to be published in the forthcoming issue of THE JOURNAL.

CALENDAR OF MEETINGS

AMERICAN ACADEMY OF PERIODONTOLOGY (Council Meeting), Chicago, February 10.

AMERICAN ACADEMY OF RESTORATIVE DENTISTRY, Chicago, February 10-11.

AMERICAN ASSOCIATION OF ORTHODONTISTS, Colorado Springs, Colo., May 21-24.

AMERICAN DIETETIC ASSOCIATION, Cincinnati, Ohio, October 15-19.

ASSOCIATION OF AMERICAN WOMEN DENTISTS, Chicago, February 11-12.

CHICAGO DENTAL SOCIETY MIDWINTER MEETING, February 12-15.

CLEVELAND DENTAL SOCIETY CHILDREN'S DENTAL HEALTH DAY, February 5.

DISTRICT OF COLUMBIA DENTAL SOCIETY, second Tuesday in each month, at the Medical Society Auditorium, Washington.

THOMAS P. HINMAN MIDWINTER CLINIC, Atlanta, Ga., March 25-27.

ILLINOIS ALPHA OMEGA, Chicago, February 11.

GREATER PHILADELPHIA ANNUAL MEETING, January 31-February 2.

ROCKY MOUNTAIN MIDWINTER MEETING, Denver, Colo., January 7-10.

STATE SOCIETIES

February

Minnesota, at Minneapolis (27-March 1)

March

Wisconsin (19-21)

April

Kentucky, at Louisville (2-4)
Louisiana, at New Orleans (24-26)
Massachusetts, at Boston (30-May 3)
Michigan, at Detroit (16-18)
Oklahoma, at Oklahoma City (15-18)
South Carolina, at Columbia (22-24)
Virginia, at Roanoke (23-25)

May

Connecticut, at Bridgeport (2-4)
Illinois, at Peoria (7-10)
Mississippi, at Jackson (6-8)
New Jersey, at Atlantic City (8-11)
Pennsylvania, at Philadelphia (1-3)
South Dakota, at Watertown (13-15)
Tennessee, at Knoxville (14-17)
Vermont, at Burlington (23-24)

June

Washington, at Spokane (21-23)

STATE BOARDS OF DENTAL EXAMINERS

North Carolina at Raleigh, June 25. Wilbert Jackson, Rich Bldg., Clinton, Secretary.

Pennsylvania, at Pittsburgh, January 18-20 and 29-31; at Philadelphia, April 16-21. Reuben E. V. Miller, Harrisburg, Secretary.

AMERICAN ACADEMY OF PERIODONTOLOGY

A COUNCIL meeting of the American Academy of Periodontology will be held February 10, at 2 p.m., at the Stevens Hotel, Chicago.

RAYMOND E. JOHNSON, *Secretary,*
Lowry Medical Arts Bldg.,
St. Paul 2, Minn.

AMERICAN ACADEMY OF RESTORATIVE DENTISTRY

THE American Academy of Restorative Dentistry will hold its sixteenth annual meeting February 10-11 at the Stevens Hotel, Chicago.

W. SAMUEL TUCKER, *Secretary,*
940 Canal Bldg.,
New Orleans 12, La.

AMERICAN ASSOCIATION OF ORTHODONTISTS

THE next meeting of the American Association of Orthodontists will be held at the Broadmoor Hotel, Colorado Springs, Colo., May 21-24. Members of the American Dental Association are invited to attend. Cre-

dentials should be obtained in advance from the secretary of the American Association of Orthodontists or from the secretary of a constituent society.

MAX E. ERNST, *Secretary,*
1250 Lowry Medical Arts Bldg.,
St. Paul 2, Minn.

AMERICAN DIETETIC ASSOCIATION

THE twenty-eighth annual meeting of the American Dietetic Association will be held at the Netherland-Plaza Hotel, Cincinnati, Ohio, October 15-19.

ASSOCIATION OF AMERICAN WOMEN DENTISTS

THE Association of American Women Dentists will meet in Chicago February 11 and 12, with headquarters at the Blackstone Hotel.

MURIEL K. G. ROBINSON, *Secretary,*
4906 Walnut St.,
Philadelphia, Pa.

CHICAGO DENTAL SOCIETY MIDWINTER MEETING

THE eighty-first Midwinter Meeting of the Chicago Dental Society will be held February 12-15 at the Stevens Hotel. As in previous years, the meeting will consist of a series of practical essays, limited attendance clinics, question and answer periods and table clinics. The meeting will include a large commercial exhibit at which all important firms in the dental field will be represented. George W. Hax is the general chairman of the meeting. The president of the society is Harold W. Oppice.

H. A. HARTLEY, *Secretary,*
30 N. Michigan Ave.,
Chicago 2, Ill.

CLEVELAND DENTAL SOCIETY

THE Cleveland Dental Society will hold the fifth annual Children's Dental Health Day February 5 at the Hotel Carter.

C. F. TUMA,
13201 Miles Ave.,
Cleveland 5, Ohio.

DISTRICT OF COLUMBIA DENTAL SOCIETY

THE District of Columbia Dental Society holds its meetings on the second Tuesday of every month, at the Medical Society Auditorium, 1718 M. St., N.W., Washington.

J. WALTER BERNHARD, *Secretary,*
1835 Eye St., N.W.,
Washington.

THOMAS P. HINMAN MIDWINTER CLINIC

THE Thomas P. Hinman Midwinter Clinic will be held at the Municipal Auditorium, Atlanta, Ga., March 25-27.

S. A. GARRETT, *Chairman,*
302 Medical Arts Bldg.,
Atlanta, Ga.

ILLINOIS ALPHA OMEGA

ILLINOIS ALPHA OMEGA will sponsor a dinner in conjunction with the opening of the Midwinter Meeting of the Chicago Dental Society, Sunday evening, February 11, at the Morrison Hotel; Eugene Aron, Secretary.

B. P. DAVIDSON,
3324 Diversey Ave.,
Chicago, Ill.

GREATER PHILADELPHIA ANNUAL MEETING

THE Greater Philadelphia Annual Meeting will be held January 31-February 2, at the Benjamin Franklin Hotel, Philadelphia, Pa.

ABRAM COHAN, *Chairman,*
Publicity Committee,
269 S. 19th St.,
Philadelphia 3, Pa.

ROCKY MOUNTAIN MIDWINTER MEETING

THE thirty-eighth annual Rocky Mountain Midwinter Meeting of the Denver Dental Association will be held at the Cosmopolitan Hotel in Denver, Colo., January 7-10. William R. Humphrey is chairman.

A. G. CLARKE, *Secretary,*
Rocky Mountain Midwinter Meeting,
611 Republic Bldg.,
Denver, Colo.

CONNECTICUT STATE DENTAL ASSOCIATION

THE eighty-first annual meeting of the Connecticut State Dental Association will be held at the Hotel Stratford, Bridgeport, May 2-4.

EARLE S. ARNOLD, *Secretary.*

KENTUCKY STATE DENTAL ASSOCIATION

THE eighty-fifth annual meeting of the Kentucky State Dental Association will be held at the Brown Hotel, Louisville, April 2-4.

J. L. WALKER, *Secretary,*
640 Barbee Way South,
Louisville.

ILLINOIS STATE DENTAL SOCIETY

THE next meeting of the Illinois State Dental Society will be held May 7-10 at the Pere Marquette Hotel, Peoria.

L. H. JACOB, *Secretary,*
634 Jefferson Bldg.,
Peoria 2.

LOUISIANA STATE DENTAL SOCIETY

THE Louisiana State Dental Society will hold its annual meeting in New Orleans April 24-26 at the Roosevelt Hotel.

F. HAROLD WIRTH,
General Chairman,
Local Arrangements Committee,
829 Maison Blanche Bldg.,
New Orleans 16.

MASSACHUSETTS DENTAL SOCIETY
(Change of dates)

THE place and dates of meeting of the Massachusetts Dental Society have been changed from the Statler Hotel, Boston, May 14-17 to the Hotel Bradford, Boston, April 30-May 3.

EVELYN F. EATON, *Executive Secretary,*
106 Marlborough St.,
Boston.

MICHIGAN STATE DENTAL SOCIETY

THE eighty-ninth annual meeting of the Michigan State Dental Society will be held April 16-18 at the Hotel Statler, Detroit.

S. G. APPLEGATE,
General Chairman,
630 E. Jefferson Ave.,
Detroit.

MINNESOTA STATE DENTAL ASSOCIATION

THE sixty-second annual session of the Minnesota State Dental Association will be held in the Municipal Auditorium, Minneapolis, February 27-March 1.

L. M. CRUTTENDEN, *Secretary,*
498 Lowry Medical Arts Bldg.,
St. Paul.

MISSISSIPPI DENTAL ASSOCIATION

THE Mississippi Dental Association will hold its next annual meeting in Jackson at the Robert E. Lee Hotel, May 6-8.

O. L. COLEE, *Secretary,*
Magnolia.

NEW JERSEY STATE DENTAL SOCIETY

THE next meeting of the New Jersey State Dental Society will be held in Atlantic City, at the Hotel Claridge, May 8-11.

F. K. HEAZELTON, *Secretary,*
223 E. Hanover St.,
Trenton.

OKLAHOMA STATE DENTAL SOCIETY

THE Oklahoma State Dental Society will hold its 1945 meeting in Oklahoma City April 15-18.

E. W. WISE, *Secretary.*

PENNSYLVANIA STATE DENTAL SOCIETY

THE Pennsylvania State Dental Society will hold its seventy-seventh annual meeting in Philadelphia, May 1-3, at the Bellevue-Stratford Hotel.

C. J. HOLLISTER, *Executive Secretary,*
217 State St.,
Harrisburg.

SOUTH CAROLINA STATE DENTAL ASSOCIATION

THE seventy-fifth, "Diamond Jubilee," annual meeting of the South Carolina State Dental Association will be held at the Columbia Hotel, Columbia, April 22-24.

C. M. DOUGLAS, *President,*
State Hospital,
Columbia.

SOUTH DAKOTA STATE DENTAL SOCIETY

THE sixty-third annual session of the South Dakota State Dental Society will be held in the Grand Hotel, Watertown, May 13-15.

ERNEST W. ELMEN, *Secretary,*
Sioux Falls.

TENNESSEE STATE DENTAL ASSOCIATION

THE seventy-eighth annual meeting of the Tennessee State Dental Association will

be held at the Hotel Andrew Jackson, Knoxville, May 14-17.

E. JEFF JUSTIS, *Secretary,*
1504 Exchange Bldg.,
Memphis 3.

VERMONT STATE DENTAL SOCIETY

THE next annual meeting of the Vermont State Dental Society will be held at the Van Ness Hotel, Burlington, May 23-24.

VIRGINIA STATE DENTAL ASSOCIATION

THE next annual meeting of the Virginia State Dental Association will be held in Roanoke, at the Hotel Roanoke, April 23-25.

J. E. JOHN, *Secretary,*
Medical Arts Bldg.
Roanoke.

WASHINGTON STATE DENTAL ASSOCIATION

THE next meeting of the Washington State Dental Association will be held at Spokane, June 21-23.

G. D. WILLIAMS, *President,*
511 Paulsen Bldg.,
Spokane.

WISCONSIN STATE DENTAL SOCIETY

THE 1945 meeting of the Wisconsin State Dental Society, the Diamond Jubilee, will be held March 19-21.

NORTH CAROLINA STATE BOARD OF DENTAL EXAMINERS

THE next meeting of the North Carolina State Board of Dental Examiners will be held at the state capitol, Raleigh, beginning June 25. Applications must be filed with the secretary thirty days before the examination. For application blanks and further information, address

WILBERT JACKSON, *Secretary,*
Rich Bldg.,
Clinton.

DENTAL COUNCIL AND EXAMINING BOARD OF THE COMMONWEALTH OF PENNSYLVANIA

THE Dental Council and Examining Board of the Commonwealth of Pennsylvania will meet in Pittsburgh to examine applicants for licensure to practice dentistry January 18-20 (clinical) and January 29-31 (written). Examinations will be held in Philadelphia April 16-21. Applications must be filed thirty days before the examination. For further information and application blanks, address the Department of Public Instruction, Bureau of Professional Licensing, Dental Division, Harrisburg.

REUBEN E. V. MILLER, *Secretary.*

ALPHA OMEGA

ALL Massachusetts members of Alpha Omega in service, both in this country and abroad, are required to communicate with Abraham Gurvitz, War Service Committee, Alpha Omega Fraternity, 371 Commonwealth Ave., Boston 15, Mass.

SAMUEL S. HIRSON, *Secretary,*
Boston Alumni Chapter,
471 Commonwealth Ave.,
Boston, Mass.

COLORADO DIVISION OF PUBLIC HEALTH

THE Colorado State Board of Health recently appointed a laboratory approval committee for the purpose of revising its program pertaining to the approval of laboratories making serologic tests in accordance with the premarital and prenatal laws now in effect. The committee is now formulating the minimum standards for attainment by the various laboratories in Colorado that desire to be continued or placed upon the approved list. Laboratories performing serologic tests for syphilis will be circularized with an invitation to participate in the program. It is possible that the list circularized may not be complete. Since it is the desire that no laboratory performing serologic tests for syphilis be discriminated against, it is requested that all directors of laboratories write the secretary of Laboratory Approval Committee, 430 State Office Bldg., Denver, for further details. The members of the committee are: A. J. Markley, professor of dermatology, and L. Florio, professor of public health and hygiene, Colorado University Medical School, Denver, chairman and vice chairman, respectively; C. W. Maynard, pathologist, Pueblo; W. Chadwick, medical director, Denver Rapid Treatment Center, Denver, and W. H. Gaub, director, Division of Laboratories, Colorado Division of Public Health, Denver, secretary.

DENTAL INTERNSHIPS AND FELLOWSHIPS

THE Walter G. Zoller Memorial Dental Clinic, University of Chicago, offers rotating internship appointments. The clinic maintains four divisions of service: 1. The Zoller Clinic in Billings Hospital for all types of dental service. 2. The University Dental Clinic in Billings Hospital for diagnosis and minor oral surgery. 3. The Prenatal Dental Clinic in Chicago Lying-In Hospital for general service. 4. The Orthopedic Dental Clinic in the Home for Destitute Crippled Children for general dentistry. In addition to clinical practice, the intern is assigned to the department of anesthesia for instruction in the administration of general anesthetics. Opportunity is afforded to witness major surgical procedures about the face and jaws.

The Zoller clinic offers fellowships to those who desire advanced training in the basic sciences and who wish to equip themselves for dental teaching and research. Appointments carry liberal stipends and free tuition.

Interns and fellows have the privilege of attending all departmental seminars. Those interested should write for application blanks to the Director, Walter G. Zoller Memorial Dental Clinic, University of Chicago, Chicago 37, Ill.

INTERNSHIP AND VOLUNTEER EXTERNSHIPS

THERE is an internship, as well as several volunteer externships, available for recent graduates in the Dental Department of the Bronx Hospital. Opportunity is offered for training and experience in oral surgery and exodontia, orthodontia, periodontia, endodontia (root-canal therapy) and operative dentistry. Application forms can be obtained by communicating with S. Burton Gerstner, Director, Dental Department, Bronx Hospital, Fulton Ave. at 169th St., Bronx 56, N. Y.

INTERNSHIPS AND RESIDENCY

Two dental intern and one dental resident vacancies are announced by the St. Louis City Hospital, appointments available immediately. Address Leo J. Wade, M.D., medical director, Office of City Hospital, 1515 Lafayette Ave., St. Louis, Mo.

DENTAL INTERNSHIPS, NEW YORK

THE Greater New York Conference of Hospital Dental Services, comprised of a group of men who are chiefs of dental services, would like to aid those men seeking dental internships in hospitals in the metropolitan area. Those who are not in the Army or the Navy and who are desirous of obtaining internships should communicate with

MARY E. REILLY, *Secretary,*
386 Fourth Ave.,
New York, N. Y.

DENTAL INTERNSHIPS

AN internship is available to a recent dental graduate at the Research and Educational Hospital of the University of Illinois Medical Center. An unusual opportunity is afforded for training and experience in hospital dentistry and the medical aspects of dental diseases. Application forms can be obtained from the Dean, University of Illinois College of Dentistry, 808 South Wood St., Chicago 12, Ill.

DENTAL INTERNSHIPS AT EASTMAN DENTAL DISPENSARY

THERE are a number of internships available in the Eastman Dental Dispensary, Rochester, N. Y., in the various departments because of vacancies created by those who have joined the armed forces, and an unusual opportunity is afforded for training and experience in children's dentistry exodontia and orthodontia. There will also be opportunities for promotion to the positions of chiefs of dental services. Interns are paid $1,500 to $2,000 per annum, the salary depending on the term of service. Applications should be made to

HARVEY J. BURKHART, *Director,*
P. O. Box 879,
Rochester 3, N. Y.

INTERNSHIPS IN ORAL SURGERY AND ORTHODONTICS

Two vacancies for interns in oral surgery and orthodontia will be available January 1 and April 1, at the Post-Graduate Hospital, 303 E. 20th St., New York 3, N. Y.

W. B. TALBOT, *Superintendent.*

RESEARCH FELLOWSHIPS

APPLICATIONS for Research Fellowships in Medicine, Dentistry and Pharmacy at the University of Illinois are now being

considered for the year beginning September 1, 1945. Appointees to these fellowships must have completed a training of not less than eight years beyond high school graduation. The fellowship carries a stipend of $1,200 per calendar year with one month's vacation. Application blanks and further information can be secured from the secretary of the Committee on Graduate Work in Medicine, Dentistry and Pharmacy, 1853 W. Polk St., Chicago 12, Ill.

CARNEGIE FELLOWSHIPS FOR RESEARCH AND GRADUATE WORK IN THE DENTAL SCIENCES

AIDED by the Carnegie Corporation of the New York and the Eastman Dental Clinic, the School of Medicine and Dentistry of the University of Rochester offers scholarships paying $1,200-$1,800 per annum to well-trained dental graduates who are interested in research or who desire special training in the basic medical sciences as an aid in dental teaching or practice. A few fellowships also offer part-time training in oral surgery. On appointment, the applicant is given the title of Fellow in Dentistry and, according to his interests, works as a graduate student in one of the departments of the medical schools. Here, excellent laboratory facilities, adequate direction and close contact with various investigations related to medicine and dentistry help his research and study. Fellows are encouraged to attend medical classes, seminars and staff meetings and, when opportunity presents itself, to participate in class instruction and scientific meetings. Contact with the problems of clinical dentistry may be maintained through the Oral Surgery Clinic of the Strong Memorial Hospital and the Rochester Dental Dispensary. With the approval of the Graduate Council of the university, Fellows may prepare themselves for the degree of M.S. or Ph.D. Applications should be made to

GEORGE H. WHIPPLE, *Dean,*
Rochester, N. Y.

FEDERAL POSITIONS FOR DENTAL HYGIENISTS

THE United States Civil Service Commission is continuing to recruit dental hygienists for federal positions. Experience is no longer necessary.

Completion of a full course leading to graduation from a recognized school of oral hygiene and registration as a dental or oral hygienist in a state, territory or the District of Columbia will qualify applicants.

Students enrolled in schools of oral hygiene may apply for federal positions when they are within nine months of completion of the course and may enter on duty on completion and registration. There are no age limits for the positions and no written tests. Appointees receive $1,970 a year entrance salary, which incorporates compensation for eight hours of overtime included in the present forty-eight hour federal work week. The majority of positions are in Army hospitals and dispensaries throughout the country, particularly in the West and Southwest. Vacancies may occur also in the Veterans Administration and the Public Health Service. Applications should be filed with the Civil Service Commission, Washington 25, D. C.

W. C. HULL, *Executive Assistant,*
United States Civil Service Commission,
Washington, D. C.

PRIZE ESSAY CONTEST, AMERICAN ASSOCIATION OF ORTHODONTISTS

THE Research Committee of the American Association of Orthodontists is empowered by the board of directors to conduct a prize essay contest. The prize has been set at $200 and will be offered annually until further notice. The terms of the competition are as follows:

Eligibility: Any student enrolled in a recognized university, or any person who has completed his or her formal education in orthodontia not more than two years prior to January 1, 1945, is eligible to compete for the prize.

Essay: The essay must represent a piece of original research having a direct bearing on the field of orthodontia. It may relate either to a biologic or a clinical problem and may represent material that has been offered in partial fulfilment of the requirements of a graduate or postgraduate degree, or any graduate, postgraduate or undergraduate contest. No papers previously submitted for publication or in press will be accepted. All essays must be in the hands of the committee not later than two months prior to the

annual meeting of the association. Consult the periodic literature for this date. If no essay is deemed worthy by the committee, the prize will be withheld.

Award: The prize-winning essay will be accorded a place on the scientific program of the annual meeting of the association, at which time the prize will be awarded. The association will retain publication rights of the first three choices. For further information, address

ALLAN G. BRODIE, *Chairman,*
Research Committee, A.A.O.
30 North Michigan Ave.,
Chicago 2, Ill.

GRADUATE SCHOOL OF MEDICINE, UNIVERSITY OF PENNSYLVANIA

THE Graduate School of Medicine of the University of Pennsylvania, organized in 1916 to provide for graduate studies in clinical medicine, has enlarged the scope of its activities to include graduate studies in dentistry, according to an announcement by George William McClelland, president of the university. The graduate dental studies will be under the direction of John W. Ross, who has been appointed vice-dean for dentistry in the graduate school of medicine. He will work in cooperation with the vice deans for other medical studies under Robin C. Buerki, dean of the graduate school of medicine. In connection with the new graduate program in dentistry, courses are being planned for graduate studies in oral surgery, orthodontics, prosthetics and oral medicine-periodontics, according to Dr. Buerki.

The first period of study for those students entering on the graduate program will be devoted to basic studies involving the medical sciences as applied to the clinical specialties concerned, together with the principles and practice of that specialty, and its relation to other clinical specialties. The studies of this period will lead to a certificate.

The second period of study will be under preceptors and this period must be preceded by the basic studies at the university. The successful completion of the period of study carried on under the preceptors will lead to the degree of master of science in dentistry.

Dr. Buerki pointed out that the program in dentistry in the graduate school of medicine will be independent of the school of dentistry at the university, but that the two schools will work in complete accord, and facilities and faculty of the school of dentistry will be available for the graduate studies and special work in the respective clinical fields.

UNITED STATES PATENTS APPLICABLE OR PERTAINING TO DENTISTRY ISSUED DURING NOVEMBER 1944

November 7

2,362,103, ARTHUR E. SMITH. Ampoule.

2,362,165, ARTHUR E. SMITH. Hypodermic syringe.

November 14

2,362,487, JOSEPH ANTHONY HOPKINS. Denture cleanser.

2,362,660, JAMES H. MOYER and DAVID E. EVANS. Apparatus for carding artificial teeth.

2,362,741, JOSEPH D. BERKE. External fixations of bone fractures.

D-139,446, LEO D. BRUBAKER. Design for an artificial tooth facing.

D-139,447, LEO D. BRUBAKER. Design for an artificial tooth facing.

November 21

2,363,081, WILLIAM F. RINGK. Anesthetic compounds, intermediates, and processes therefor.

2,363,082, WILLIAM F. RINGK. Anesthetic compounds, intermediates, and processes therefor.

2,363,083, WILLIAM F. RINGK. Anesthetic compounds.

2,363,141, ERNEST R. PERTICS. Dental handpiece.

November 28

2,363,997, HERMAN JOSEPH ROTHMAN. Artificial tooth display card.

D-139,524, LOUIS J. LASKIN. Design for a denture brush.